College Curriculum Committee Meeting Agenda
Tuesday, January 23, 2018
2:00 p.m. – 3:30 p.m.
President's Conference Room

Item	Action	Attachment(s)	Presenter
1. Minutes: December 5, 2017	Action	#1/23/18-1	Campbell
2. Report Out from Division Reps	Discussion		All
3. Announcements a. New Course Proposals b. Notification of Proposed Requisites c. Update on Curriculum Process Redesign d. BOARS Endorsement of Changes to Major Preparation Requirements	Information	 #1/23/18-2—7 #1/23/18-8 #1/23/18-9	Campbell
4. Consent Calendar a. GE Applications	Action	 #1/23/18-10—12	Campbell
5. Additions to Course Families: Combatives, Team Sports (Kinesiology)	Action	#1/23/18-13	Campbell
6. Stand Alone Approval Request: ALCB 400A	1st Read	#1/23/18-14	Campbell
7. Stand Alone Approval Request: ALCB 400C	1st Read	#1/23/18-15	Campbell
8. Stand Alone Approval Request: ALCB 400E	1st Read	#1/23/18-16	Campbell
9. Stand Alone Approval Request: JRNL 22A	1st Read	#1/23/18-17	Campbell
10. Stand Alone Approval Request: JRNL 22B	1st Read	#1/23/18-18	Campbell
11. Stand Alone Approval Request: JRNL 60	1st Read	#1/23/18-19	Campbell
12. Stand Alone Approval Request: JRNL 61	1st Read	#1/23/18-20	Campbell
13. Stand Alone Approval Request: JRNL 62	1st Read	#1/23/18-21	Campbell
14. Stand Alone Approval Request: JRNL 64	1st Read	#1/23/18-22	Campbell
15. Stand Alone Approval Request: JRNL 70R series	1st Read	#1/23/18-23	Campbell
16. Stand Alone Approval Request: LINC 77	1st Read	#1/23/18-24	Campbell
17. Stand Alone Approval Request: LINC 84A	1st Read	#1/23/18-25	Campbell
18. Stand Alone Approval Request: LINC 84B	1st Read	#1/23/18-26	Campbell
19. Proposed Exception Process for Starting Courses Prior to Catalog Publication	1st Read	#1/23/18-27	Campbell
20. Good of the Order			Campbell
21. Adjournment			Campbell

Consent Calendar:

Foothill General Education (attachments #1/23/18-10—12)

Area IV—Social & Behavioral Sciences: KINS 10, 51; PSYC 9

Attachments:

#1/23/18-1 Draft Minutes: December 5, 2017
#1/23/18-2 New Course Proposal: ART 15D
#1/23/18-3 New Course Proposal: D A 100
#1/23/18-4 New Course Proposal: JAPN 101A
#1/23/18-5 New Course Proposal: JAPN 101B
#1/23/18-6 New Course Proposal: JAPN 101C
#1/23/18-7 New Course Proposal: JAPN 101D

#1/23/18-8 CCC Notification of Proposed Requisites
#1/23/18-9 BOARS Memo 1/5/18
#1/23/18-13 Proposal to Add New Courses to Course Families in Kinesiology
#1/23/18-14 Stand Alone Course Approval Request: ALCB 400A
#1/23/18-15 Stand Alone Course Approval Request: ALCB 400C
#1/23/18-16 Stand Alone Course Approval Request: ALCB 400E
#1/23/18-17 Stand Alone Course Approval Request: JRNL 22A
#1/23/18-18 Stand Alone Course Approval Request: JRNL 22B
#1/23/18-19 Stand Alone Course Approval Request: JRNL 60
#1/23/18-20 Stand Alone Course Approval Request: JRNL 61
#1/23/18-21 Stand Alone Course Approval Request: JRNL 62
#1/23/18-22 Stand Alone Course Approval Request: JRNL 64
#1/23/18-23 Stand Alone Course Approval Request: JRNL 70R series
#1/23/18-24 Stand Alone Course Approval Request: LINC 77
#1/23/18-25 Stand Alone Course Approval Request: LINC 84A
#1/23/18-26 Stand Alone Course Approval Request: LINC 84B
#1/23/18-27 Exception Process for Starting Courses Prior to Catalog Publication (Draft)

2017-2018 Curriculum Committee Meetings:

Fall 2017 Quarter	Winter 2018 Quarter	Spring 2018 Quarter
~~10/3/17~~	1/23/18	4/24/18
~~10/24/17~~	2/6/18	5/8/18
~~11/14/17~~	2/20/18	5/22/18
~~11/21/17~~	3/6/18	6/5/18
~~12/5/17~~	3/20/18	6/19/18

Standing reminder: Items for inclusion on the CCC agenda are due no later than one week before the meeting.

2017-2018 Curriculum Deadlines:

~~*12/1/17*~~ Deadline to submit courses to CSU for CSU GE approval (Articulation Office).
~~*12/1/17*~~ Deadline to submit courses to UC/CSU for IGETC approval (Articulation Office).
2/1/18 Curriculum Sheet updates for 2018-19 catalog (Faculty/Divisions).
2/15/18 Deadline to submit local GE applications for 2017-18 catalog (Faculty/Divisions).
6/1/18 Deadline to submit new/revised courses to UCOP for UC transferability (Articulation Office).
6/22/18 COR/Title 5 updates for 2019-20 catalog (Faculty/Divisions).
Ongoing Submission of courses for C-ID approval and course-to-course articulation with individual colleges and universities (Articulation Office).

Distribution:
Mark Anderson (FA), Ben Armerding (LA), Rachelle Campbell (Faculty Co-Chair), Zachary Cembellin (PSME), Sara Cooper (BH), Bernie Day (Articulation Officer), LeeAnn Emanuel (DRC), Isaac Escoto (AS President), Hilda Fernandez (LA), Marnie Francisco (PSME), Evan Gilstrap (CNSL), Brenda Hanning (BH), Kurt Hueg (Dean, BSS), Eric Kuehnl (FA), Andrew LaManque (AVP Instruction, Administrator Co-Chair), Kristy Lisle (VP Instruction), Kent McGee (Evaluations), Bruce McLeod (Apprenticeship), Ronnie Miller (ASFC), Tiffany Rideaux (BSS), Katy Ripp (KA), Ben Schwartzman (DRC), Lety Serna (CNSL), Barbara Shewfelt (KA), Nanette Solvason (Dean, BH), Paul Starer (Dean, LA), Mary Thomas (LIBR), Mary Vanatta (Curriculum Coordinator), Anand Venkataraman (PSME), Bill Ziegenhorn (BSS)

Updated 10/20/17

COLLEGE CURRICULUM COMMITTEE

Committee Members - 2017-18

Meeting Date: 1/23/18

Co-Chairs (2)

✓	Rachelle Campbell	7469	Vice President, Academic Senate (tiebreaker vote only)	campbellrachelle @fhda.edu
✓	Andrew LaManque	7179	Assoc. Vice President of Instruction and Institutional Research	lamanqueandrew@fhda.edu

Voting Membership (12 total; 1 vote per division)

✓	Mark Anderson	7156	FA	andersonmark@fhda.edu
✓	Benjamin Armerding	7453	LA	armerdingbenjamin@fhda.edu
✓	Zachary Cembellin	7383	PSME	cembellinzachary@fhda.edu
✓	Sara Cooper	7595	BH	coopersara@fhda.edu
✓	Bernie Day	7225	Articulation	daybernie@fhda.edu
✓	Hilda Fernandez	7542	LA	fernandezhilda@fhda.edu
✓	Marnie Francisco	7420	PSME	franciscomarnie@fhda.edu
✓	Evan Gilstrap	7675	CNSL	gilstrapevan@fhda.edu
✓	Brenda Hanning	7466	BH	hanningbrenda@fhda.edu
	Kurt Hueg	7394	Dean—BSS	huegkurt@fhda.edu
✓	Eric Kuehnl	7479	FA	kuehnleric@fhda.edu
✓	Tiffany Rideaux	7412	BSS	rideauxtiffany@fhda.edu
✓	Katy Ripp (W & S)	7355	KA	rippkaty@fhda.edu
✓	Leticia Serna	7059	CNSL	sernaleticia@fhda.edu
	Barbara Shewfelt (F)	7658	KA	shewfeltbarbara@fhda.edu
	Nanette Solvason	7730	Dean—BH	solvasonnanette@fhda.edu
✓	Paul Starer	7227	Dean—LA	starerpaul@fhda.edu
✓	Mary Thomas	7522	Library	thomasmary@fhda.edu
✓	Anand Venkataraman	7495	PSME	venkataramananand@fhda.edu
✓	Bill Ziegenhorn	7799	BSS	ziegenhornbill@fhda.edu

Non-Voting Membership (4)

	Ronnie Miller		ASFC Rep.	
✓	Mary Vanatta	7439	Curr. Coordinator	vanattamary@fhda.edu
	Kent McGee	7298	Evaluations	mcgeekent@fhda.edu
			SLO Coordinator	

Visitors

Bruce McLeod, LeeAnn Emanuel, Lisa DeLapo, Sharon Garcia-Vega

College Curriculum Committee
Meeting Minutes
Tuesday, December 5, 2017
2:00 p.m. – 3:30 p.m.
President's Conference Room

Item	Discussion
1. Minutes: November 21, 2017	**Approved by consensus.**
2. Report Out from Division Reps	**Speaker: All** Bio Health: Dental Hygiene dept. interested in cross-listing some upper division courses with AHS; question regarding if this would differ from current process—regular cross-listing process should be used. Also, D H wants to offer new upper division GE courses; Campbell noted that we currently have no formal process for upper division GE. LaManque noted that CCC did create guidelines for review/approval of upper division *[note: Upper Division GE Criteria Proposal was discussed/approved at the 1/19/16 CCC meeting]*. Will bring topic of upper division GE back to CCC for discussion at a future meeting. BSS: Rep asked for status of Social Justice Studies ADT—Day noted that CCCCO in process of determining how to handle submissions, as Foothill submitted program with three tracks within one degree, but another college submitted as three separate degrees. Hoping for an update soon. Counseling: No updates. Library: No updates. PSME: No updates. Kinesiology: Wrapping up 2018-19 COR updates. SRC: Recent meeting focused on ALLD 402 *[note: item #6]*. Language Arts: New JAPN courses being developed for students taking Japanese Language Proficiency Test. English dept. plans to focus on updating courses for C-ID compliance. Apprenticeship: Campbell requested group discuss item #14 *[note: see that item for discussion]*.
3. Announcements a. New Course Proposal b. Notification of Proposed Requisites	**Speaker: Rachelle Campbell** The following proposal was presented: ENGL 38. Day noted course might not qualify for UC transferability; still working on it, but course number might need to change. New/updated requisites for CHEM 30A, C S 3C, MATH 1BH (all effective 2018-19); also listed are ongoing requisites, for which a Content Review form was not on file. Note that CHEM 30A update is to remove MATH 217 as prerequisite.
4. Consent Calendar a. GE Applications	**Speaker: Rachelle Campbell** The following GE applications were presented: Area I—CRWR 25A, ENGL 37, HUMN 7H. No comments. **Approved by consensus.**

5. Stand Alone Approval Request: AHS 60E	**Speaker: Rachelle Campbell** Second read of Stand Alone Approval Request for AHS 60E. No comments. Motion to approve **M/S** (Thomas, Cooper). **Approved.**
6. Stand Alone Approval Request: ALLD 402	**Speaker: Rachelle Campbell** Second read of Stand Alone Approval Request for ALLD 402. The application has been updated for clarity, based on feedback at previous meeting. No comments. Motion to approve **M/S** (Venkataraman, Thomas). **Approved.**
7. Stand Alone Approval Request: NCLA 407A	**Speaker: Rachelle Campbell** Second read of Stand Alone Approval Request for NCLA 407A. The application has been updated for clarity, based on feedback at previous meeting. Counseling rep noted conversation with faculty (Katie Ha) regarding removing "personal statements" from course description, but language remains. Language Arts rep stated Ha is amenable to updating description; course focused on things like sentence structure, and not content of items being written. Counseling rep expressed concern that students will misunderstand description and believe course will address content of writing. L A rep noted faculty already do inform students that they cannot help with content, and refer them to others for such help. Bio Health rep noted title specifies "grammar and rhetoric;" suggested "personal statements" remain in description so students will know intent of course. Campbell asked if form should be pulled for further discussion—Vanatta concerned with delay in regard to catalog deadlines. L A rep relayed Ha's suggested update to first sentence of description: "This course provides students support and practice in editing and revising the grammar and rhetoric of personal statements for college and scholarship applications." Vanatta will follow up with Ha to update description on COR. Motion to approve **M/S** (Cooper, Armerding). **Approved.**
8. Stand Alone Approval Request: NCLA 407B	**Speaker: Rachelle Campbell** Second read of Stand Alone Approval Request for NCLA 407B. The application has been updated for clarity, based on feedback at previous meeting. No comments. Motion to approve **M/S** (Venkataraman, Fernandez). **Approved.**
9. Stand Alone Approval Request: NCLA 407C	**Speaker: Rachelle Campbell** Second read of Stand Alone Approval Request for NCLA 407C. The application has been updated for clarity, based on feedback at previous meeting. No comments. Motion to approve **M/S** (Serna, Armerding). **Approved.**
10. Stand Alone Form Revision	**Speaker: Andrew LaManque** Second read of document. Slight update following first read—added "select all that apply" to Criteria A instructions. Motion to approve **M/S** (Serna, Cooper). **Approved.** Vanatta will post to CCC website shortly; will email reps when that has happened. Will still accept submissions on old version of form through end of winter quarter.
11. New Program Application: Interventional Pulmonology Certificate of Achievement	**Speaker: Rachelle Campbell** First read of new Interventional Pulmonology Certificate of Achievement. Campbell and LaManque requested combining first

	and second reads in order to speed up submission to the state. Motion to suspend rules **M/S** (Serna, Cooper). **Approved.** Bio Health rep Hanning presented program. 18 units, geared to those already licensed. Relatively new need; growing number of hospitals offering services. Hospitals would like individuals to begin working with a specific base level of training, which program will provide. Research component also included. All courses already active; already much interest and demand for this topic. Counseling rep asked about application process—ideally, individuals already doing these procedures and could have clinical rotations where they work. If demand exceeds current course offerings, can add more, but increased clinical availability may be tricky. Sutter interested in 20-30 of their staff completing program. Campbell noted this follows trend in Allied Health, for those wishing to be upskilled—individual finds their own clinical training opportunity. Currently 24 students in cohort, completing second quarter. BSS rep asked if program should prompt group to discuss issue of non-transcriptable vs. transcriptable certificates—topic is later on today's agenda. Motion to approve **M/S** (Ziegenhorn, Day). **Approved.**
12. Stand Alone Approval Request: NCEN 400	**Speaker: Rachelle Campbell** First read of Stand Alone Approval Request for NCEN 400. Will be permanently Stand Alone. Course to accompany current Summer Bridge program. Counseling rep noted that, in the past, program has incorporated counseling (e.g., CNSL 5 content); would like clarification on how counseling will be incorporated, going forward. Campbell noted Vanatta's earlier comment *[note: in item #7]* regarding delay of noncredit course approvals; asked if group would consider combining first and second reads. Language Arts and Counseling reps will discuss counseling involvement outside of CCC. Motion to suspend rules **M/S** (Armerding, Ziegenhorn). **Approved.** Motion to approve **M/S** (Fernandez, Cooper). **Approved.**
13. English Advisory Statements	**Speaker: Rachelle Campbell** Clarification requested at previous meeting, regarding specifics of proficiency level of students who have completed courses listed in current English Advisory statement (ESLL 125 & 249). L A rep Armerding presented topic. Old sequence of ESLL/ENGL included ESLL 26, which will be deactivated. New course of ESLL 126 will be added and become prerequisite to ENGL 1A. Note that sequence attached to today's agenda still lists old ESLL 25, which is now ESLL 125. BSS rep noted that faculty in division would like to ensure that students have certain level of proficiency in order to, for example, read and synthesize articles in subjects like sociology and psychology. L A rep noted that ENGL 1A should certainly fulfill this level of proficiency. Vanatta noted that English proficiency Advisory statement lists ESLL 125 & 249, not ENGL 1A. L A rep noted statement will be updated effective summer 2018 to change ESLL 125 & 249 to ESLL 126. ESLL 126 COR includes information about reading and writing taught in course. Comment that change from ESLL 26 to 126 will add a step in the sequence, which could create issues related to AB 705. LaManque noted that

	De Anza will now have a different model than Foothill, since they will still offer an equivalent to ESLL 26. L A rep noted that ESLL dept. has drafted a memo, which offers rationale behind decision, including assessment of SLOs and issue of ESLL 26 being treated as a prerequisite for ENGL 1A but also equivalent to the course *[note: this memo will be attached to the CCC agenda for 1/23/18]*. Campbell asked BSS rep if clarification is sufficient. L A rep offered to meet with BSS division to provide further clarity, if requested. BSS rep noted that gaining understanding of different levels of courses should help provide faculty with accurate expectation of students' abilities. SRC rep asked if requirement of students to be able to write an essay within a certain time period is a local rule or from outside body—Day noted no such timed writing requirement for UC, only word count minimum.
14. Apprenticeship Resolution—Exemption to Curriculum Cycle	**Speaker: Rachelle Campbell** Apprenticeship rep presented resolution; extension of last year's exception for group of new Sheet Metal courses. Apprenticeship CC has discussed and recognizes current college-wide discussions around speeding up curriculum process, overall; intent is not to circumvent curriculum process in any way. Due to special nature of Apprenticeship programs and students, argument presented for a quicker path to offering new courses once approved by the state. As with certain Allied Health programs, Apprenticeship must respond to influence by outside bodies. AVP Ray Kaupp noted that some colleges have separate process for career courses, but intent of resolution is not to decouple or have separate process here at Foothill. Noted that VPI allowed to approve career courses, and submission to CCCCO is not approval but more like registration—Campbell noted this is true for all credit courses, not just CTE/workforce courses. LaManque mentioned submission of annual certification form. Campbell noted CCCCO does still fully review all noncredit courses; goal is for noncredit to eventually also be locally approved. Counseling rep asked if current timeline should still be applied to noncredit—Campbell noted issue of catalog rights. Campbell noted current exception process for "emergency" situations, such as outside bodies changing policies—suggested creation of formal policy/process. Noted that, for true streamlining, submissions to Vanatta from divisions must be pristine; asked if this aspect discussed by Apprenticeship CC. Work being done by group outside of CCC to propose changes to the catalog process for the immediate future, to try to address the needs of everyone. One caveat is the UC/CSU transferability process is outside of our control and cannot be changed. LaManque has been meeting with Marketing staff, VPI Kristy Lisle, Vanatta, and others to see what may be feasible. LaManque noted hope is to work out a plan to transition this year and possibly put in a process with two annual deadlines, publishing some sort of catalog twice per year. Still working out particulars. Kaupp asked if de facto policy for emergencies could be codified—yes. Apprenticeship rep noted Apprenticeship CC asking for simply the speeding up of a course becoming active after submission to the state. Hope is that courses coming through Apprenticeship in the future will be much cleaner, now that division CC has been up and running. Counseling rep asked how catalog rights will be affected, if curriculum being changed mid-year. LaManque noted likely need

	to publish an addendum; has already been discussing with Counseling dean Lan Truong. Possibly annual catalog with mid-year addendum. Note that catalog rights not quite the same for Apprenticeship courses and programs, with possible exception of new APAV courses, since they will be CSU transferable. Counseling rep asked about catalog rights regarding GE for Apprenticeship students in AA/AS degree programs—would need to be figured out. For second read, Kaupp requested CCC consider additional programs, outside of Apprenticeship, that could be included. Campbell noted CCC can revisit topic of emergency requests in January. Still critical to address quality of submissions to Vanatta; meetings that Campbell and LaManque will have with divisions in winter quarter will address this. Please share and discuss with your constituents. Second read and possible action will occur at next meeting.
15. Report on Degrees Awarded	**Speaker: Andrew LaManque** Data comes from Program Review. Note significant increases in ADTs, but decline in local AA degrees. Note drop in students receiving IGETC certificate of achievement—Day noted past practice of a student automatically receiving one when they complete the sequence; Counseling rep noted he does encourage students to submit paperwork for it. Day seconded mention of significant increase in ADTs being awarded, as well as increase in degrees awarded, overall, since the first year Foothill offered ADTs. LaManque noted degrees and certificates that have had zero awarded over the past few years, which speaks to the need to discuss relevancy of continuing to offer them.
16. College Level Examination Program (CLEP) Introduction	**Speaker: Bernie Day** Similar to Advanced Placement (AP), CLEP is credit by exam and run by the College Board. 33 different exams with scoring system; students are supposed to receive college credit, above a certain score. In a way, Foothill already awards credit, due to CSU GE certification—pass-along CLEP for those students. But no local policy for any other situation. Most who use CLEP tend to be veterans, homeschooled students, students close to graduation but missing a course. Most popular subject is English composition. All CSU campuses award CLEP credit, but UC system does not. Review of CSU CLEP policy (attached to CCC agenda). De Anza has a published policy on how credit is awarded for CSU GE pass-along, but Foothill does not (De Anza also has no local policy). This is likely CCC's first discussion of CLEP; will need to determine how to move forward. BSS rep noted this alternative, like AP, puts a lot of pressure on quality of exam—almost all are multiple choice and do not include writing component; noted that scoring seems unclear. Concerned about such quality, and problems associated with such. Day noted that scoring varies from 20-80, with a recalibrated level of 50. Kaupp asked about awarding of units—units are awarded, which student pays for (without enrolling in a course). Student would satisfy associated CSU GE requirement, but no course-to-course equivalency (same as with AP). PSME rep noted that Computer Science not listed; dept. interested in figuring out a credit by exam process. Campbell noted local credit by exam would be a separate process/policy, unrelated to CLEP. Day noted that when she worked with faculty, a few years ago, to revisit AP policy, faculty reviewed AP exams to determine each dept.'s decision—could do same for CLEP.

	Hueg asked about next step—Day will follow up to see what faculty resources are available. Discussion will continue at a future meeting.
17. Non-transcriptable Certificates	**Speaker: Rachelle Campbell** Brief update, due to time constraint. Need to address drafting specific policy for creation of a new non-transcriptable certificate. CCCCO set to announce lowering the minimum number of units for a (transcriptable) certificate of achievement, which will require Foothill to submit some of our non-transcriptable certificates for state approval. Will know more next year regarding timeline of changes and compliance. Hueg noted earlier comment regarding number of programs on current books with no completers.
18. Good of the Order	
19. Adjournment	**3:32 PM**

Attendees: Ben Armerding (LA), Rachelle Campbell (Faculty Co-Chair), Zachary Cembellin (PSME), Sara Cooper (BH), Bernie Day (Articulation Officer), LeeAnn Emanuel (SRC), Hilda Fernandez (LA), Evan Gilstrap (CNSL), Brenda Hanning (BH), Kurt Hueg (Dean, BSS), Ray Kaupp (guest—AVP Workforce), Eric Kuehnl (FA), Andrew LaManque (AVP Instruction, Administrator Co-Chair), Bruce MacLeod (Apprenticeship), Tiffany Rideaux (BSS), Leticia Serna (CNSL), Barbara Shewfelt (KA), Mary Thomas (LIBR), Mary Vanatta (Curriculum Coordinator), Anand Venkataraman (PSME), Bill Ziegenhorn (BSS)

Minutes Recorded by: M. Vanatta

Foothill College
College Curriculum Committee
New Course Proposal

This form should be completed by the faculty author as preparation to writing a new course. Your division CC rep can assist you in completing it appropriately, and will forward it to the Office of Instruction for inclusion as an announcement at the next available CCC meeting. The purpose of this form is ***interdisciplinary communication****. The responsibility to rigorously review and approve new courses remains with the divisional curriculum committees.*

Faculty Author: Jordan C. Fong

Proposed Number: ART 15D **Proposed Units:** 4
Proposed Hours: 3 hours lecture, 3 hours laboratory
Proposed Transferability: CSU/UC
Proposed Title: Digital Illustration for Film & Animation

Proposed Catalog Description & Requisites:
Advanced instruction using computers, digital tablets and software to produce digital illustrations, sketches, images, and drawings for artistic expression and design focused for Live-action Film and Feature Film Animation media. Emphasis on skills and concepts related to human anatomy, gesture drawing, character design, and basic Illustration, Visual Development, and Composition Principles.

Prerequisite: ART 15A.

Advisory: ART 4E, GID 37, GID 43. Familiarity with current interface operations for desktop computers, laptops and digital tablets.

Proposed Discipline: Art, Graphic Arts

To which Degree(s) or Certificate(s) would this course potentially be added?
To be added to the Art curriculum sheet.

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
Possibly *GID 43 Illustration & Digital Imaging* might be affected; however, *Digital Illustration for Film & Animation* is focused on creating digital concept art and designs for live-action and animation film. While illustrations will be discussed and utilized, course work, projects, and labs/lec are not focused on the fundamentals of illustration or digital imaging manipulation.

Comments & Other Relevant Information for Discussion:
Recommended standard 2D-Digital paint and drawing software to expose to students would be Adobe Photoshop and Corel Painter, as well as digitalizing drawing tablets. Intent of course would be to prepare students for possible internships, entry level

positions, and careers opportunities specifically as Concept Artists, Visual Development, or Matte Painters for Film & Animation industries.

Instruction Office:
Date presented at CCC:
Number assigned:

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

Foothill College
College Curriculum Committee
New Course Proposal

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Faculty Author: Cara Miyasaki

Proposed Number: D A 100 **Proposed Units:** 1
Proposed Hours: 1 hour lecture
Proposed Transferability: None
Proposed Title: Law & Ethics for the Dental Assistant

Proposed Catalog Description & Requisites:
Dental assisting professional, legal and ethical responsibilities. The role of the dental auxiliary with regards to patient communication and office personnel relations.

Proposed Discipline: Dental Technology
(For guidance, refer to the Minimum Quals handbook, available on the CCC webpage.)
Note: If any proposed discipline falls within the purview of another division, please verify approval from that division. Division Rep: _____ *Date:* _____

To which Degree(s) or Certificate(s) would this course potentially be added?
Dental Assisting

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
None

Comments & Other Relevant Information for Discussion:
Dental assisting graduates must take a law and ethics written exam for California state licensure. A formal lecture class would assist the students in passing this exam.

Instruction Office:
Date presented at CCC:
Number assigned:

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Foothill College
College Curriculum Committee
New Course Proposal

*This form should be completed by the faculty author as preparation to writing a new course. Your division CC rep can assist you in completing it appropriately, and will forward it to the Office of Instruction for inclusion as an announcement at the next available CCC meeting. The purpose of this form is **interdisciplinary communication**. The responsibility to rigorously review and approve new courses remains with the divisional curriculum committees.*

Faculty Author: Ikuko Rakow

Proposed Number: JAPN 101A **Proposed Units:** 4
Proposed Hours: 4 hours lecture
Proposed Transferability: Not transferable
Proposed Title: JAPANESE LANGUAGE PROFICIENCY TEST (JLPT) PREPARATION I

Proposed Catalog Description & Requisites:
This course is designed to help prepare students for the Japanese Language Proficiency Test (JLPT) N4 level. It aims at enabling students to pass the JLPT N4 level. In this course, students will comprehensively expand their proficiency in Japanese and increase ability to use the knowledge in actual communication. This course covers vocabulary, kanji, grammar, reading comprehension and listening comprehension related to the JLPT N4 level. Special emphasis is placed on reading and listening comprehension. Student will also learn a strategy to pass the JLPT N4 level.

Advisory: JAPN 3 (1 year of college level Japanese or equivalent)

Proposed Discipline: Foreign Languages
(For guidance, refer to the Minimum Quals handbook, available on the CCC webpage.)
Note: If any proposed discipline falls within the purview of another division, please verify approval from that division. Division Rep: _____ *Date:* _____

To which Degree(s) or Certificate(s) would this course potentially be added?
This course can satisfy the unit requirement for the AA Degree in Japanese.

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
No

Comments & Other Relevant Information for Discussion:
The Japanese Language Proficiency Test (JLPT) is the most recognized Japanese language test, and there is an increased demand for JLPT preparation classes among Japanese language learners. In order to pass the test, students especially need to be trained to improve their reading and listening skills because that is the way the test is structured. We

believe that this course which focuses on reading and listening comprehension will be useful to help prepare students for the Japanese Language Proficiency Test.

Instruction Office:
Date presented at CCC:
Number assigned:

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Foothill College
College Curriculum Committee
New Course Proposal

*This form should be completed by the faculty author as preparation to writing a new course. Your division CC rep can assist you in completing it appropriately, and will forward it to the Office of Instruction for inclusion as an announcement at the next available CCC meeting. The purpose of this form is **interdisciplinary communication**. The responsibility to rigorously review and approve new courses remains with the divisional curriculum committees.*

Faculty Author: Ikuko Rakow

Proposed Number: JAPN 101B **Proposed Units:** 4
Proposed Hours: 4 hours lecture
Proposed Transferability: Not transferable
Proposed Title: JAPANESE LANGUAGE PROFICIENCY TEST (JLPT) PREPARATION II

Proposed Catalog Description & Requisites:
Continuation of JAPN 101A. It aims at enabling students to pass the JLPT N4 level. Development of intermediate level of reading and listening skills by understanding a more complex range of information. Reading and listening skills and ability to use the knowledge in actual communication are to be developed through classroom activities and homework assignments. Special emphasis is placed on rapidity of correct perception and acquaintance with a variety of native dialects, and familiarity with oral idioms and grammar. Student will also learn a strategy to pass the JLPT N4 level.

Advisory: JAPN 101A.

Proposed Discipline: Foreign Languages
(For guidance, refer to the Minimum Quals handbook, available on the CCC webpage.)
Note: If any proposed discipline falls within the purview of another division, please verify approval from that division. Division Rep: _____ *Date:* _____

To which Degree(s) or Certificate(s) would this course potentially be added?
This course can satisfy the unit requirement for the AA Degree in Japanese.

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
No

Comments & Other Relevant Information for Discussion:
The Japanese Language Proficiency Test (JLPT) is the most recognized Japanese language test, and there is an increased demand for JLPT preparation classes among Japanese language learners. In order to pass the test, students especially need to be trained to improve their reading and listening skills because that is the way the test is structured. We

believe that this course which focuses on reading and listening comprehension will be useful to help prepare students for the Japanese Language Proficiency Test.

Instruction Office:
Date presented at CCC:
Number assigned:

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

Foothill College
College Curriculum Committee
New Course Proposal

*This form should be completed by the faculty author as preparation to writing a new course. Your division CC rep can assist you in completing it appropriately, and will forward it to the Office of Instruction for inclusion as an announcement at the next available CCC meeting. The purpose of this form is **interdisciplinary communication**. The responsibility to rigorously review and approve new courses remains with the divisional curriculum committees.*

Faculty Author: Ikuko Rakow

Proposed Number: JAPN 101C **Proposed Units:** 4
Proposed Hours: 4 hours lecture
Proposed Transferability: Not transferable
Proposed Title: JAPANESE LANGUAGE PROFICIENCY TEST (JLPT) PREPARATION III

Proposed Catalog Description & Requisites:
Continuation of JAPN 101B. It aims at enabling students to pass the JLPT N4 level. Further development of intermediate level of reading and listening by increasing vocabulary and by understanding socio-linguistic features such as honorific verbs and extra-modest expressions. Reading and listening experience in an environment of increasingly challenging language situation. Students will gain a high level of communicative competence and continue to learn kanji. Student will also learn a strategy to pass the JLPT N4 level.

Advisory: JAPN 101B.

Proposed Discipline: Foreign Languages
(For guidance, refer to the Minimum Quals handbook, available on the CCC webpage.)
Note: If any proposed discipline falls within the purview of another division, please verify approval from that division. Division Rep: _____ *Date:* _____

To which Degree(s) or Certificate(s) would this course potentially be added?
This course can satisfy the unit requirement for the AA Degree in Japanese.

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
No

Comments & Other Relevant Information for Discussion:
The Japanese Language Proficiency Test (JLPT) is the most recognized Japanese language test, and there is an increased demand for JLPT preparation classes among Japanese language learners. In order to pass the test, students especially need to be trained to improve their reading and listening skills because that is the way the test is structured. We

believe that this course which focuses on reading and listening comprehension will be useful to help prepare students for the Japanese Language Proficiency Test.

Instruction Office:
Date presented at CCC:
Number assigned:

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

Foothill College
College Curriculum Committee
New Course Proposal

*This form should be completed by the faculty author as preparation to writing a new course. Your division CC rep can assist you in completing it appropriately, and will forward it to the Office of Instruction for inclusion as an announcement at the next available CCC meeting. The purpose of this form is **interdisciplinary communication**. The responsibility to rigorously review and approve new courses remains with the divisional curriculum committees.*

Faculty Author: Ikuko Rakow

Proposed Number: JAPN 101D **Proposed Units:** 4
Proposed Hours: 4 hours lecture
Proposed Transferability: Not transferable
Proposed Title: JAPANESE LANGUAGE PROFICIENCY TEST (JLPT) PREPARATION IV

Proposed Catalog Description & Requisites:
Continuation of JAPN 101C. It aims at enabling students to pass the JLPT N4 and it also helps prepare students for the JLPT N3 level. Development of advanced level of reading and listening skills by understanding a more abstract range of information relating to high-frequency situations and by exploring various forms of authentic materials such as current news media and drama. Student will gain a high level of communicative competence and continue to learn kanji. Student will also learn a strategy to pass the JLPT N3 level as well as the JLPT N4 level.

Advisory: JAPN 101C.

Proposed Discipline: Foreign Languages
(For guidance, refer to the Minimum Quals handbook, available on the CCC webpage.)
Note: If any proposed discipline falls within the purview of another division, please verify approval from that division. Division Rep: _____ *Date:* _____

To which Degree(s) or Certificate(s) would this course potentially be added?
This course can satisfy the unit requirement for the AA Degree in Japanese.

Are there any other departments that may be impacted from the addition of this course? Please identify those departments and the effect:
No

Comments & Other Relevant Information for Discussion:
The Japanese Language Proficiency Test (JLPT) is the most recognized Japanese language test, and there is an increased demand for JLPT preparation classes among Japanese language learners. In order to pass the test, students especially need to be trained to improve their reading and listening skills because that is the way the test is structured. We

believe that this course which focuses on reading and listening comprehension will be useful to help prepare students for the Japanese Language Proficiency Test.

Instruction Office:
Date presented at CCC:
Number assigned:

CCC Notification of Proposed Prerequisites/Co-Requisites

The following courses are currently undergoing review for requisite additions or changes. Please contact the Division Curriculum Rep if you have any questions or comments.

Target Course Number & Title	Editor	Requisite Course Number & Title	New/Ongoing
ACTG 52: Advanced Accounting	J. Nava	Prereq: ACTG 51A (Intermediate Accounting I)	Ongoing
ACTG 53: Financial Statement Analysis	J. Nava	Prereq: ACTG 1B or 1BH (Financial Accounting II or Honors version)	Ongoing
ACTG 68C: Advanced Tax Accounting III	S. Seyedin	Prereq: ACTG 67 (Tax Accounting)	Ongoing
ACTG 76: Ethics in Accounting	L. Drake	Prereq: ACTG 1A (Financial Accounting I)	Ongoing
CHLD 86B: Practicum Student Teaching in an Early Childhood Program	N. Kerbey	Prereq: CHLD 1 (Child Growth & Development: Prenatal Through Early Childhood)	Ongoing
CHLD 86B: Practicum Student Teaching in an Early Childhood Program	N. Kerbey	Prereq: CHLD 56N (Principles & Practices of Teaching Young Children)	Ongoing
CHLD 86B: Practicum Student Teaching in an Early Childhood Program	N. Kerbey	Prereq: CHLD 88 (Child, Family & Community)	Ongoing
CHLD 86B: Practicum Student Teaching in an Early Childhood Program	N. Kerbey	Prereq: CHLD 89 (Curriculum for Early Care & Education Programs)	Ongoing
CRWR 39B: Advanced Short Fiction Writing	L. Dauer	Prereq: CRWR 39A Introduction to Short Fiction Writing	Ongoing
ENGL 47AH: Honors World Literature I	B. Lewis	Prereq: ENGL 1A, 1AH, 1S & 1T or ESLL 26.	New for 2018-19
ENGL 47BH: Honors World Literature II	B. Lewis	Prereq: ENGL 1A, 1AH, 1S & 1T or ESLL 26.	New for 2018-19
ESLL 228: Developing Language Skills for ESL Students	R. Morasci	Prereq: TOEFL score of 475-499 or appropriate placement test score.	Ongoing
THTR 7: Introduction to Directing	J. Bergmann	Prereq: THTR 20A (Acting I)	Ongoing
THTR 40B: Theatrical Makeup for Production	J. Bergmann	Prereq: THTR 40A (Basic Theatrical Makeup)	Ongoing

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BOARD OF ADMISSIONS AND RELATIONS WITH SCHOOLS (BOARS)
Henry Sánchez, Chair
Henry.Sanchez@ucsf.edu

Assembly of the Academic Senate
1111 Franklin Street, 12th Floor
Oakland, CA 94607-5200
Phone: (510) 987-9466
Fax: (510) 763-0309

January 5, 2018

STEPHEN HANDEL
ASSOCIATE VICE PRESIDENT, UNDERGRADUATE ADMISSIONS

Dear Steve,

The Board of Admissions and Relations with Schools (BOARS) has endorsed the enclosed Statement on Practice on Changes to Major Prerequisites and Advanced Notification to California Community Colleges, and we encourage you to share it with relevant stakeholders.

Thank you for your continuing cooperation in this critical area.

Sincerely,

Henry Sánchez, MD
BOARS Chair

cc: Members of the Board of Admissions and Relations with Schools (BOARS)
Executive Director Baxter

Guiding Principles on Notification of Changes to Major Preparation Requirements for Transfer Students

To reaffirm the shared commitment by the University of California (UC) and the California Community Colleges (CCC) to provide access and opportunity for students seeking to transfer, UC should adhere to the following guiding principles:

- The CCCs are responsible for preparing students who might not otherwise have access to higher education for transfer and the baccalaureate degree. UC, in turn, is responsible for admitting qualified junior-level transfers and ensuring that they have meaningful access to the baccalaureate degree.

- UC campus academic departments or divisional Senate committees determine the major preparation requirements and courses used for selection of transfer applicants prior to matriculation at UC; the purpose of major preparation is to ensure student success in upper division courses and improve students' time to degree.

- Transfer-bound students should have adequate time to plan for and complete required major preparation and major selection courses prior to enrolling at UC.

- Academic departments or divisional Senate committees occasionally modify program content or degree requirements thus affecting major preparation for transfer students. The effective date for modifications to required major preparation courses (new, additional or replacement courses) and the articulation of such courses for incoming junior-level transfer students should be announced no less than two academic years prior to the effective date for students already enrolled at the UC campus. For example, a new major preparation course introduced as effective for fall 2018 should not be required of new incoming junior transfer students until admission selection for fall 2020.

- If a major preparation course is not available or not articulated at a CCC, academic departments may choose to admit students with the expectation that they will successfully complete the course upon matriculation at the UC campus.

December 11, 2017

- Notification of changes to required major preparation, major selection and/or course articulations must be provided to the nine UC undergraduate admission offices, campus Articulation Officers and all CCCs.

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: KINS 10 Women in Sports

Breadth Criteria:

At Foothill College, the primary objective of the general education requirements is to provide students with the depth and breadth of knowledge and understanding required to be independent, thinking persons who are able to interact successfully with others as educated and productive members of our diverse society. Design and implementation of the general education curriculum ensures that students have exposure to all major disciplines, understand relationships among the various disciplines, and appreciate and evaluate the collective knowledge and experiences that form our cultural and physical heritage. General education courses provide content that is broad in scope and at an introductory depth, and all require critical thinking.
A general education enables students to clarify and present their personal views as well as respect, evaluate, and be informed by the views of others. This academic program is designed to facilitate a process that enables students to reach their fullest potential as individuals, national and global citizens, and lifelong learners for the 21st century.

In order to be successful, students are expected to have achieved minimum proficiency in math (MATH 105) and English (ENGL 1A, 1AH or ESL 26) before enrolling in a GE course.
A completed pattern of general education courses provides students with opportunities to acquire, practice, apply, and become proficient in each of the core competencies listed below.

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research).
B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).
B3. Creative, critical, and analytical thinking (reasoning, questioning, problem solving, and consideration of consequence).
B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).
B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

Depth Criteria for Area IV-Social & Behavioral Sciences:

The social sciences embrace a large number of interrelated subjects that examine the relationship of human beings to society.

Courses meeting the General Education Requirement in Social and Behavior Sciences ***must*** include ***all of the following*** student learning outcomes:
S1. Explain the interactions of people as members of societies, cultures and social subgroups;
S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;
S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

In addition, courses meeting this requirement ***must*** include ***at least three*** of the following student learning outcomes:
S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;
S5. Explain world development and global relationships;
S6. Recognize the rights, duties, responsibilities, and opportunities of community members;
S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;
S8. Assess the distribution of power and influence;
S9. Analyze current events and global issues in the context of historic, ethical and social patterns;
S10. Comprehend and engage in social, economic and political issues at the local, national and global level;
S11. Display knowledge of human motivations, behaviors and relationships;
S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;
S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;
S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: KINS 10 Women in Sports

Please map each appropriate component from the **Course Outline of Record** to the appropriate depth and breadth criteria. You can use any part of your COR including course outcomes, expanded content, methods of instruction/evaluation, and/or lab content.

Depth Map: Must include the following:

S1. Explain the interactions of people as members of societies, cultures and social subgroups;

Matching course component(s):
Description
This course provides students with a chronological history, analysis and interpretation of people, events, and issues that affect women in sport, in past and present day society. Physiological, sociological and psychological aspects of female athletes as related to sports, history, and education will be covered. Students will gain an understanding of the significant events of women in athletics from the past to the present and how their significance will determine the future of women in sports.

Course Objectives
The student will be able to:

A. Develop an understanding of the history and impact of women in athletics/sports
B. Demonstrate critical analysis of physiological, sociological, and psychological issues of women in sports
C. Examine the unique needs of female athletes, their stamina, and physical abilities
D. Assess the impact of of female athletes and such obstacles as pregnancy, balancing families, and their gender identity
E. Develop student responsibility
F. List past and present sociological and historical issues as they relate to women athletes in sports and society
G. Determine how athletics can be means to future education and career prospects through scholarships and various funding opportunities for women athletes
H. Develop ideas about the possible future for women in sports as related to career opportunities
I. Interpret the impact of sport participation on life after sports

S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;

Matching course component(s):
Course Objectives
The student will be able to:

A. Develop an understanding of the history and impact of women in athletics/sports
B. Demonstrate critical analysis of physiological, sociological, and psychological issues of women in sports
C. Examine the unique needs of female athletes, their stamina, and physical abilities
D. Assess the impact of of female athletes and such obstacles as pregnancy, balancing families, and their gender identity
E. Develop student responsibility
F. List past and present sociological and historical issues as they relate to women athletes in sports and society
G. Determine how athletics can be means to future education and career prospects through scholarships and various funding opportunities for women athletes
H. Develop ideas about the possible future for women in sports as related to career opportunities
I. Interpret the impact of sport participation on life after sports

Method of Instruction
Lecture, Discussion, Cooperative learning exercises, Electronic discussions/chat.

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

Matching course component(s):

Depth Map: Additionally, must include at least three of the following:

S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;

Matching course component(s):

Course Objectives

The student will be able to:

A. Develop an understanding of the history and impact of women in athletics/sports
B. Demonstrate critical analysis of physiological, sociological, and psychological issues of women in sports
C. Examine the unique needs of female athletes, their stamina, and physical abilities
D. Assess the impact of of female athletes and such obstacles as pregnancy, balancing families, and their gender identity
E. Develop student responsibility
F. List past and present sociological and historical issues as they relate to women athletes in sports and society
G. Determine how athletics can be means to future education and career prospects through scholarships and various funding opportunities for women athletes
H. Develop ideas about the possible future for women in sports as related to career opportunities
I. Interpret the impact of sport participation on life after sports

Course Content

B. Sociological issues
    1. Balancing families, pregnancy, and athletics
    2. Gender and sport
    3. Economics and sport
    4. Stereotypes in society in society regarding women in sport
    5. Influence of media and advertising
    6. Influence of professional sports
    7. Society, culture, and their influence
    8. Culture and its influence

S5. Explain world development and global relationships;

Matching course component(s):

S6. Recognize the rights, duties, responsibilities, and opportunities of community members;

Matching course component(s):

Course Objectives

The student will be able to:

A. Develop an understanding of the history and impact of women in athletics/sports
B. Demonstrate critical analysis of physiological, sociological, and psychological issues of women in sports
C. Examine the unique needs of female athletes, their stamina, and physical abilities
D. Assess the impact of of female athletes and such obstacles as pregnancy, balancing families, and their gender identity
E. Develop student responsibility

Course Content

B. Sociological issues
    1. Balancing families, pregnancy, and athletics
    2. Gender and sport
    3. Economics and sport

4. Stereotypes in society in society regarding women in sport
5. Influence of media and advertising
6. Influence of professional sports
7. Society, culture, and their influence
8. Culture and its influence

S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;

Matching course objective(s):
Course Objectives
The student will be able to:

G. Determine how athletics can be means to future education and career prospects through scholarships and various funding opportunities for women athletes
H. Develop ideas about the possible future for women in sports as related to career opportunities

Course Content

F. Women in sports careers
    1. Coaching
    2. Sports Writing
    3. Media and Broadcasting

S8. Assess the distribution of power and influence;

Matching course component(s):

S9. Analyze current events and global issues in the context of historic, ethical and social patterns;

Matching course component(s):

S10. Comprehend and engage in social, economic and political issues at the local, national and global level;

Matching course component(s):

S11. Display knowledge of human motivations, behaviors and relationships;

Matching course component(s):
Course Content

B. Sociological issues
    1. Balancing families, pregnancy, and athletics
    2. Gender and sport
    3. Economics and sport
    4. Stereotypes in society in society regarding women in sport
    5. Influence of media and advertising
    6. Influence of professional sports
    7. Society, culture, and their influence
    8. Culture and its influence
        a. Social class associated with specific sports
        b. Gender associated with specific sports
        c. Ethnicity associated with specific sports
E. Continuing education
    1. Advantages of obtaining the bachelor's degree
    2. Life after sport
F. Women in sports careers
    1. Coaching
    2. Sports Writing
    3. Media and Broadcasting
    4. Promotions

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;

Matching course component(s):

S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;

Matching course component(s):

S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

Matching course component(s):

Breadth Mapping: please indicate all that apply (if applicable)

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research)

Matching course component(s):
Methods of Evaluation

A. Participation in class discussions and/or other activities
B. Creation of a class timeline of events that are significant to the history, present and future of women in sports
C. Research paper based on chosen event or person from the class created timeline
D. Self-evaluation of each individual's perception of his/her experiences, past, present, and future, as related to a female athlete in society
E. Collaborative biographies created on each timeline event that the students choose to represent
F. Written Exams
G. Final Examination

B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).

Matching course component(s):

B3. Clearly and precisely express their ideas in a logical and organized manner using the discipline-appropriate language

Matching course component(s):
Methods of Evaluation

A. Participation in class discussions and/or other activities
B. Creation of a class timeline of events that are significant to the history, present and future of women in sports
C. Research paper based on chosen event or person from the class created timeline
D. Self-evaluation of each individual's perception of his/her experiences, past, present, and future, as related to a female athlete in society
E. Collaborative biographies created on each timeline event that the students choose to represent
F. Written Exams
G. Final Examination

Course Objectives
The student will be able to:

A. Develop an understanding of the history and impact of women in athletics/sports
B. Demonstrate critical analysis of physiological, sociological, and psychological issues of women in sports
C. Examine the unique needs of female athletes, their stamina, and physical abilities

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

D. Assess the impact of of female athletes and such obstacles as pregnancy, balancing families, and their gender identity
E. Develop student responsibility
F. List past and present sociological and historical issues as they relate to women athletes in sports and society
G. Determine how athletics can be means to future education and career prospects through scholarships and various funding opportunities for women athletes
H. Develop ideas about the possible future for women in sports as related to career opportunities
I. Interpret the impact of sport participation on life after sports

Types and/or Examples of Required Reading, Writing and Outside of Class Assignments

A. Reading Assignments:
    1. Weekly reading assignments from text
    2. Supplemental reading assignments from web source relevant to course material
B. Writing Assignments:
    1. Weekly assignments to answer essay questions relevant to course material
    2. Optional reports of historical females in sport

B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).

Matching course component(s):

B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

Matching course component(s):

Requesting Faculty: Lauren Hickey Date: 10/19/17

Division Curr Rep: Barbara Shewfelt Date: 10/24/17

REVIEW COMMITTEE USE ONLY:

Review Committee Members:

Fatima Jinnah, Patricia Gibbs Stayte, Samuel Connell

Comments:

There is no mention of Title IX Legislation. It is a fundamentally important and groundbreaking piece of legislation directly related to the subject of women in sports.
As well, the application doesn't talk about variations in women's experiences by race or class. The language used in the application seems to kind of avoid specificity, be very general and seems somewhat vague. If there is already a Sport in Society course on the books at Foothill, then it seems like this, KINS 10, course is an opportunity to really delve into issues and experiences of women in sports - most of which has been shaped by patriarchal, classist and racist systems.
Last, it would be good to see international examples of women's experiences in sports.
The addition of these things would move the course from being more descriptive to more analytical (giving it more depth) and show women's experiences as often being a struggle against patriarchal and often racist sports institutions and/or societies of which they are a part.
Recommended for approval by subcommittee 1/17/18

Approved:_____ Denied:_____ CCC Co-Chair Signature:_____ Date:_____

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: KINS 51 PERFORMANCE ENHANCING SUBSTANCES IN SPORT & EXERCISE

Breadth Criteria:

At Foothill College, the primary objective of the general education requirements is to provide students with the depth and breadth of knowledge and understanding required to be independent, thinking persons who are able to interact successfully with others as educated and productive members of our diverse society. Design and implementation of the general education curriculum ensures that students have exposure to all major disciplines, understand relationships among the various disciplines, and appreciate and evaluate the collective knowledge and experiences that form our cultural and physical heritage. General education courses provide content that is broad in scope and at an introductory depth, and all require critical thinking.
A general education enables students to clarify and present their personal views as well as respect, evaluate, and be informed by the views of others. This academic program is designed to facilitate a process that enables students to reach their fullest potential as individuals, national and global citizens, and lifelong learners for the 21st century.

In order to be successful, students are expected to have achieved minimum proficiency in math (MATH 105) and English (ENGL 1A, 1AH or ESL 26) before enrolling in a GE course.
A completed pattern of general education courses provides students with opportunities to acquire, practice, apply, and become proficient in each of the core competencies listed below.

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research).
B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).
B3. Creative, critical, and analytical thinking (reasoning, questioning, problem solving, and consideration of consequence).
B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).
B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

Depth Criteria for Area IV-Social & Behavioral Sciences:

The social sciences embrace a large number of interrelated subjects that examine the relationship of human beings to society.

Courses meeting the General Education Requirement in Social and Behavior Sciences ***must*** include ***all of the following*** student learning outcomes:

S1. Explain the interactions of people as members of societies, cultures and social subgroups;
S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;
S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

In addition, courses meeting this requirement ***must*** include ***at least three*** of the following student learning outcomes:

S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;
S5. Explain world development and global relationships;
S6. Recognize the rights, duties, responsibilities, and opportunities of community members;
S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;
S8. Assess the distribution of power and influence;
S9. Analyze current events and global issues in the context of historic, ethical and social patterns;
S10. Comprehend and engage in social, economic and political issues at the local, national and global level;
S11. Display knowledge of human motivations, behaviors and relationships;
S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;
S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;
S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: KINS 51 PERFORMANCE ENHANCING SUBSTANCES IN SPORT & EXERCISE

Please map each appropriate component from the **Course Outline of Record** to the appropriate depth and breadth criteria. You can use any part of your COR including course outcomes, expanded content, methods of instruction/evaluation, and/or lab content.

Depth Map: Must include the following:

S1. Explain the interactions of people as members of societies, cultures and social subgroups;

Matching course component(s):
Description
Current and historical issues, as well as general social, biochemical, pharmacological and behavioral information related to performance enhancing substances in sport and exercise. Areas to be addressed include, but are not limited to: theories of addiction, populations, social implications, anabolics, blood doping, diuretics, nutritional ergogenic aids, social and recreational drugs, stimulants, emerging science and technologies, and drug testing.
Advisory: Not open to students with credit in PHED 51.

S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;

Matching course component(s):
Course Objectives
The student will be able to:

A. Demonstrate a thorough knowledge base of performance enhancing substances and how they relate sport, exercise and contemporary society.
B. Understand and apply theories of addiction used to examine performance-enhancing substance use/abuse.
C. Analyze substance definitions, populations, substance use/abuse, and substance effects; physical, psychological and social.
D. Analyze and communicate critical thought regarding current social and behavioral issues relating to performance enhancing substances in sport and exercise and broader contexts.
E. Classify and differentiate drug types, symptoms, performance effects both short and long-term.
F. Distinguish and compare social populations and recreational drug use.
G. Examine and compare issues surrounding drug testing, state and federal laws and sport testing.

S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

Matching course component(s):
Types and/or Examples of Required Reading, Writing and Outside of Class Assignments

A. Chapters from text
B. Supplemental articles
C. Reporting on empirical academic research
D. Reflections on how to change a substance-abusing culture
E. Synthesis of historical and social relevance to performance-enhancing drugs in sport and exercise

Depth Map: Additionally, must include at least three of the following:

S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;

General Education Review Request
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Matching course component(s):
Course Content

H. Social and Recreational Drugs
   1. Definition, Use, Issues and Populations
   2. Alcohol
   3. Marijuana
   4. Effects on Performance
   5. Fact vs. Myth
   6. Social Implications/Issues

S5. Explain world development and global relationships;

Matching course component(s):

S6. Recognize the rights, duties, responsibilities, and opportunities of community members;

Matching course component(s):

S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;

Matching course objective(s):
Course Content

A. Introduction and History of Performance Enhancing Drugs
   1. Sport/Exercise History, Issues and Population Analysis
   2. Why the Demand?
   3. Ethics, Morality, Legality
   4. Social Implications of Substance Use/Abuse

S8. Assess the distribution of power and influence;

Matching course component(s):

S9. Analyze current events and global issues in the context of historic, ethical and social patterns;

Matching course component(s):
Description
Current and historical issues, as well as general social, biochemical, pharmacological and behavioral information related to performance enhancing substances in sport and exercise. Areas to be addressed include, but are not limited to: theories of addiction, populations, social implications, anabolics, blood doping, diuretics, nutritional ergogenic aids, social and recreational drugs, stimulants, emerging science and technologies, and drug testing.
Advisory: Not open to students with credit in PHED 51.

S10. Comprehend and engage in social, economic and political issues at the local, national and global level;

Matching course component(s):

S11. Display knowledge of human motivations, behaviors and relationships;

Matching course component(s):

S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;

Matching course component(s):

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S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;

Matching course component(s):

S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

Matching course component(s):

Breadth Mapping: please indicate all that apply (if applicable)

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research)

Matching course component(s):
Types and/or Examples of Required Reading, Writing and Outside of Class Assignments

A. Chapters from text
B. Supplemental articles
C. Reporting on empirical academic research
D. Reflections on how to change a substance-abusing culture
E. Synthesis of historical and social relevance to performance-enhancing drugs in sport and exercise

B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).

Matching course component(s):

B3. Clearly and precisely express their ideas in a logical and organized manner using the discipline-appropriate language

Matching course component(s):

B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).

Matching course component(s):
Course Objectives
The student will be able to:

A. Demonstrate a thorough knowledge base of performance enhancing substances and how they relate sport, exercise and contemporary society.
B. Understand and apply theories of addiction used to examine performance-enhancing substance use/abuse.
C. Analyze substance definitions, populations, substance use/abuse, and substance effects; physical, psychological and social.
D. Analyze and communicate critical thought regarding current social and behavioral issues relating to performance enhancing substances in sport and exercise and broader contexts.
E. Classify and differentiate drug types, symptoms, performance effects both short and long-term.
F. Distinguish and compare social populations and recreational drug use.
G. Examine and compare issues surrounding drug testing, state and federal laws and sport testing.

B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Matching course component(s):

Requesting Faculty: Matt Stanley Date: 10/19/17

Division Curr Rep: Barbara Shewfelt Date: 10/24/17

REVIEW COMMITTEE USE ONLY:

Review Committee Members:

Fatima Jinnah, Patricia Gibbs Stayte, Samuel Connell

Comments:

Also consider submitting this for area VII GE Recommended for approval by subcommittee 1/17/18

Approved:_____ Denied:_____ CCC Co-Chair Signature:_____ Date:_____

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: PSYC 9 Positive Psychology

Breadth Criteria:

At Foothill College, the primary objective of the general education requirements is to provide students with the depth and breadth of knowledge and understanding required to be independent, thinking persons who are able to interact successfully with others as educated and productive members of our diverse society. Design and implementation of the general education curriculum ensures that students have exposure to all major disciplines, understand relationships among the various disciplines, and appreciate and evaluate the collective knowledge and experiences that form our cultural and physical heritage. General education courses provide content that is broad in scope and at an introductory depth, and all require critical thinking.
A general education enables students to clarify and present their personal views as well as respect, evaluate, and be informed by the views of others. This academic program is designed to facilitate a process that enables students to reach their fullest potential as individuals, national and global citizens, and lifelong learners for the 21st century.

In order to be successful, students are expected to have achieved minimum proficiency in math (MATH 105) and English (ENGL 1A, 1AH or ESL 26) before enrolling in a GE course.
A completed pattern of general education courses provides students with opportunities to acquire, practice, apply, and become proficient in each of the core competencies listed below.

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research).
B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).
B3. Creative, critical, and analytical thinking (reasoning, questioning, problem solving, and consideration of consequence).
B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).
B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

Depth Criteria for Area IV-Social & Behavioral Sciences:

The social sciences embrace a large number of interrelated subjects that examine the relationship of human beings to society.

Courses meeting the General Education Requirement in Social and Behavior Sciences ***must*** include ***all of the following*** student learning outcomes:
S1. Explain the interactions of people as members of societies, cultures and social subgroups;
S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;
S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

In addition, courses meeting this requirement ***must*** include ***at least three*** of the following student learning outcomes:
S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;
S5. Explain world development and global relationships;
S6. Recognize the rights, duties, responsibilities, and opportunities of community members;
S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;
S8. Assess the distribution of power and influence;
S9. Analyze current events and global issues in the context of historic, ethical and social patterns;
S10. Comprehend and engage in social, economic and political issues at the local, national and global level;
S11. Display knowledge of human motivations, behaviors and relationships;
S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;
S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;
S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

General Education Review Request
AREA IV – SOCIAL & BEHAVIORAL SCIENCES

Course Number & Title: PSYC 9 Positive Psychology

Please map each appropriate component from the **Course Outline of Record** to the appropriate depth and breadth criteria. You can use any part of your COR including course outcomes, expanded content, methods of instruction/evaluation, and/or lab content.

Depth Map: Must include the following:

S1. Explain the interactions of people as members of societies, cultures and social subgroups;

Matching course component(s): Focus is on the empirical investigations of human potential and the development of personal psychological strengths. Among those strengths are empathy, compassion, and cooperative behaviors and the application of those skills to other members of our culture and other cultures.

Course Objectives:
9. Value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinnings of psychology as a science.

Course Content:
1. Eastern & Western Cultures & History of Positive Psychology (i.e., Individualist vs. Collectivist Cultures)
2. Wisdom
    a. Lifespan Development Theories
    b. Differences from Intelligence & Creativity
    c. Western Psychological Science
    d. Eastern Philosophies
3. Mindfulness (Western and Eastern models)
4. Love, relationships, and sexuality
    a. Western and eastern cultural differences (e.g., individualist and collectivist)

S2. Exercise critical thinking and analytical oral and/or written skills including consideration of events and ideas from multiple perspectives;

Matching course component(s): Emphasis is placed on empirical analysis of theories and research methods related to positive experiences, such as empathy, compassion, humility, and resilience from culturally diverse perspectives. Students will apply theories to their personal experience in written assignments and verbal classroom discussion.

Course Objectives:
3. Evaluate evidence for the validity, both internal and external, of empirical claims in contemporary positive psychology research.
4. Compare the research findings in positive psychology to research in traditional fields of psychology, including neuroscience, cognitive information processing, lifespan development, social psychology, personality theory, and clinical psychology.
8. Respect and use critical and creative thinking, skeptical inquiry, and when possible, the scientific approach to solve problems related to behavior and mental processes.

Learning Outcomes:
B. Identify the strengths and limitations of different research designs used by positive psychologists.

S3. Demonstrate knowledge and application of the scientific method in conducting research and in other methods of inquiry relative to the discipline.

Matching course component(s): The course reviews the theoretical value and construct validity of psychological strengths and abilities, the current research methods and outcomes regarding their relationship to each other and to other psychological constructs. Assessment methods of these constructs will also be reviewed with regards to the validities, reliabilities, and applications of these assessments in real world settings.

General Education Review Request
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Course Objectives:
2. Understand the research methods (including measure, interventions, and research paradigms).
3. Evaluate evidence for the validity, both internal and external, of empirical claims in contemporary positive psychology research.
6. Demonstrate proficiency in social science writing and in utilizing APA style.
8. Respect and use critical and creative thinking, skeptical inquiry, and when possible, the scientific approach to solve problems related to behavior and mental processes.

Learning Outcomes:
B. Identify the strengths and limitations of different research designs used by positive psychologists.

Depth Map: Additionally, must include at least three of the following:

S4. Demonstrate appreciation of and sensitivity towards diverse cultures -- their social, behavioral and organizational structure;

Matching course component(s): The course will emphasize individualized applications of cultural sensitivity such compassion, empathy, gratitude, humility, and emotional intelligence. Moreover the value of diversity in nature will be discussed from an evolutionary point of view to further ground its value.

Course Objectives:
9. Value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinn of psychology as a science.

Course Content:
1. Eastern & Western Cultures & History of Positive Psychology (i.e., Individualist vs. Collectivist Cultures)
2. Wisdom
    a. Lifespan Development Theories
    b. Differences from Intelligence & Creativity
    c. Western Psychological Science
    d. Eastern Philosophies
3. Mindfulness (Western and Eastern models)
4. Love, relationships, and sexuality
    a. Western and eastern cultural differences (e.g., individualist and collectivist)

S5. Explain world development and global relationships;

Matching course component(s): The implications of systems conceptualization and skills such as compassion and humility will be applied to leadership implications and views of other cultures.

S6. Recognize the rights, duties, responsibilities, and opportunities of community members;

Matching course component(s): Bridging the conceptual and empirical connections between strengths such as empathy, compassion, and courage to one's sense of responsibility to others and the community.

S7. Analyze the relationship of business and economic activities to the functioning of society as a whole;

Matching course objective(s): Students will investigate finding meaning in life, career and work productivity, and emotional intelligence. Empirical psychological research regarding the correlates of happiness and life satisfaction will be investigated, such as its low correlation with SES and high correlation with meaningful work and being of service to others.

S8. Assess the distribution of power and influence;

Matching course component(s):

S9. Analyze current events and global issues in the context of historic, ethical and social patterns;

Matching course component(s): Historical actions and individuals will be highlighted to exemplify high vs. low examples of strengths such as empathy, compassion, courage, and a systems conceptualization of events.

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AREA IV – SOCIAL & BEHAVIORAL SCIENCES

S10. Comprehend and engage in social, economic and political issues at the local, national and global level;

Matching course component(s):

S11. Display knowledge of human motivations, behaviors and relationships;

Matching course component(s): The course focuses on psychological skills such as empathy, compassion, forgiveness, gratitude and positive relationships. It will explore how these skills influence motivations, cognitions, and behaviors and how all of them impact on relationships.

Course Content:

A. Evolutionary Psychology
   1. Adaptations vs. Byproducts (why are we the way we are?) – emotions, relationships, motivation

B. A Systems Theory Conceptualization of Emotions (anger, family systems theory)

C. Emotional intelligence (theories, models, assessments)

D. Love, relationships, sexuality (cultural differences, research findings, application)

E. Humility & awe (impact on emotions and relationships)

F. Forgiveness (in relationships)

S12. Understand the evolutionary origins of humanity and how this relates to present day human interactions;

Matching course component(s): The field of evolutionary psychology will be reviewed with emphasis on the adaptive functions of both negative and positive emotions and behaviors, and the skills and strengths that can serve those functions. For example, understanding some of the adaptive functions of emotions such as anger, which enables achieving those functions with alternative strengths such as assertiveness and empathy.

Course Objectives:

10. Demonstrate understanding of the basic model ad applications of evolutionary psychology & systems theory

Course Content:

A. Evolutionary Psychology
   1. Genetic Predispositions vs. Genetic Determinism

- Genetic Predispositions x Environment Interactions
- Potential for development & growth

   2. Adaptations vs. Byproducts (why are we the way we are?)

- Emotions
- Relationships
- Motivation

   3. Models of Development in Evolutionary Psychology
   4. Evolutionary Clinical Psychology

B. Empathy and compassion
   1. Evolutionary Psychology and helping

C. Altruism and helping

S13. Describe how individual interaction with the natural world and external societies shapes and influences human behavior;

Matching course component(s): Exposure to the natural world and external societies is invaluable in building the skill of humility, which is correlated to many of the strengths discussed, to pro-social behaviors, and positive relationships.

Course Content:

1. Eastern & Western Cultures & History of Positive Psychology (i.e., Individualist vs. Collectivist Cultures)
2. Wisdom
   a. Lifespan Development Theories
   b. Differences from Intelligence & Creativity

c. Western Psychological Science
d. Eastern Philosophies
3. Mindfulness (Western and Eastern models)
4. Love, relationships, and sexuality
a. Western and eastern cultural differences (e.g., individualist and collectivist)

S14. Explain the association between psychological well-being, mental processes, emotions & societal functioning.

Matching course component(s): The course has an application component where students will assess their psychological strengths, learn to develop them, and practice applying them in their own lives.

Course Objectives:
4. Compare the research findings in positive psychology to research in traditional fields of psychology, includi neuroscience, cognitive information processing, lifespan development, social psychology, personality theory, a clinical psychology.
5. Application of Positive Psychology theory to situations in daily life.
7. Gain a better understanding of yourself and others in the world.
8. Respect and use critical and creative thinking, skeptical inquiry, and when possible the scientific approach to solve problems related to behavior and mental processes.

Breadth Mapping: please indicate all that apply (if applicable)

B1. Communication (analytical reading, writing, speaking, and listening skills including evaluation, synthesis, and research)

Matching course component(s): Students will critically evaluate empirical research articles and provide written and oral evaluation of theories.

Course Objectives:
1. Demonstrate knowledge of major theories and research findings in the field of positive psychology.
2. Demonstrate understanding of the research methods (including measures, interventions, and research paradigms).
3. Evaluate evidence for the validity, both internal and external, of empirical claims in contemporary positive psychology research.
4. Compare the research findings in positive psychology to research in traditional fields of psychology, includi neuroscience, cognitive information processing, lifespan development, social psychology, personality theory, a clinical psychology.
5. Application of positive psychology theory to situation of daily life.
6. Demonstrate proficiency in social science writing and in utilizing APA style.
8. Respect and use critical and creative thinking, skeptical inquiry, and when possible the scientific approach to solve problems related to behavior and mental processes.
9. Value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinn of psychology as a science.

B2. Computation (application of mathematical concepts, and/or using principles of data collection and analysis to solve problems).

Matching course component(s): Concepts from the field of Statistics such as variance and the notion of a claim being 'an empirical question' will add to the humility construct that will be reviewed and hopefully to the humility of the students as they digest research studies and are encouraged to keep an open mind.

B3. Clearly and precisely express their ideas in a logical and organized manner using the discipline-appropriate language

Matching course component(s): Written assignments will require critical thinking and citations, where applicable, will follow American Psychological Association (APA) formatting. Students will write an APA style paper that will demonstrate the knowledge of the strengths, the research related to those strengths, and their applications to everyday life.

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Course Objectives:
6. Demonstrate proficiency in social science writing and in utilizing APA style (e.g., application papers)

B4. Community and global consciousness and responsibility (consideration of one's role in society at the local, regional, national, and global level in the context of cultural constructs and historical and contemporary events and issues).

Matching course component(s): The word 'responsibility' is composed of the 'ability' to 'respond'. Strengths such as empathy, compassion, courage, and gratitude enable one to bring those strengths towards the betterment of others. In this course, the research and practical applications of those conceptual connections will be discussed.

B5. Information competency (ability to identify an information need, to find, evaluate and use information to meet that need in a legal and ethical way) and digital literacy (to teach and assess basic computer concepts and skills so that people can use computer technology in everyday life to develop new social and economic opportunities for themselves, their families, and their communities).

Matching course component(s): Students may use library resources, including electronic journal databases to search for empirical research on the psychological constructs discussed.

Course Objectives:
3. Evaluate evidence for the validity, both internal and external, of empirical claims in contemporary positive psychology research.
4. Compare the research findings in positive psychology to research in traditional fields of psychology, includi neuroscience, cognitive information processing, lifespan development, social psychology, personality theory, a clinical psychology.
8. Respect and use critical and creative thinking, skeptical inquiry, and when possible the scientific approach to solve problems related to behavior and mental processes.
9. Value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinn of psychology as a science.

Requesting Faculty: Tiffany Rideaux Date: 10/31/17

Division Curr Rep: Bill Ziegenhorn Date: 11/2/17

REVIEW COMMITTEE USE ONLY:

Review Committee Members:

Fatima Jinnah, Patricia Gibbs Stayte, Samuel Connell

Comments:

Recommended for approval by subcommittee 1/17/18

Approved:_____ Denied:_____ CCC Co-Chair Signature:_____ Date:_____

Proposal to Add New Courses to Course Families in Kinesiology

Kinesiology is making the following additions to existing course families:

Combatives
PHED 17A BEGINNING KARATE
PHED 17B INTERMEDIATE KARATE

Team Sports
PHED 43A ULTIMATE 1

The additions will go into effect for 2018-19.

Approved by the Kinesiology curriculum committee: 11/14/17

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: ALCB 400A

Course Title: LIP-READING: SIMPLE CONSONANT SOUNDS

Credit Status:

_____ Credit course
x Noncredit course

Catalog Description:

Designed for adults with acquired, congenital or progressive hearing impairment and those who have difficulty processing receptively speech in adverse listening situations. Includes the most visible basic consonant sounds of the English language and how production of these basic speech sounds appears on the lips and face of various speakers. Descriptions of mechanics of the ear, sound and hearing testing will be presented. Large area assistive listening devices will be described (e.g., T-coil, fm, infrared, personal captioning devices). Practical experience in lip-reading both in and out of class.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

x The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

_____ The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

_____ Transfer
_____ Workforce/CTE
x_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. Developed in response to local resident demand.

Criteria C. Curriculum Standards (please initial as appropriate)

EM The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Ellen Mastman **Date:** 1-10-18

Division Curriculum Representative: Ben Schwartzman **Date:** 1-10-18

Date of Approval by Division Curriculum Committee: 11-28-17

College Curriculum Co-Chairperson: _____ **Date:** _____

Student Resource and Support Programs

ALCB 400A LIP-READING: SIMPLE CONSONANT SOUNDS

Edit Course Outline

ALCB 400A **LIP-READING: SIMPLE CONSONANT SOUNDS** **Summer 2018**

24 hours total. **0 Units**

Repeatability -

Statement: Unlimited Repeatability.

Criteria: Course materials change each time, with updated language samples. For example, new examples of usages of relatively easy to see consonantal speech sounds.

Status -

Course Status: Active **Grading:** No Credit

Degree Status: Non-Applicable **Credit Status:** Non-Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:** 4-17-14; 5/1/17

Division Dean Information -

Seat Count: 20 **Load Factor:** .030 **FOAP Code:** 122010131051493031

Instruction Office Information -

FSA Code: 3700 - OAS/LIFE LONG LEARNING

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. Developed in response to local resident demand.

1. Description -

Designed for adults with acquired, congenital or progressive hearing impairment and those who have difficulty processing receptively speech in adverse listening situations. Includes the most visible basic consonant sounds of the English language and how production of these basic speech sounds appears on the lips and face of various speakers. Descriptions of mechanics of the ear, sound and hearing testing will be presented. Large area assistive listening devices will be described (e.g., T-coil, fm, infrared, personal captioning devices). Practical experience in lip-reading both in and out of class.

Prerequisite: None

Co-requisite: None

Advisory: Students are advised to set aside a short period of time each day to allow practice either in a mirror or with another individual.

2. Course Objectives -

The student will be able to:

A. describe visible homophone groups of easy to recognize consonants
B. demonstrate some ability to follow conversations and discussions using auditory and visual cues
C. demonstrate ability to focus on one person's speech, ignoring background noise, while being able to describe potential obstacles to this process
D. communicate receptively using relatively visible consonants as verbal/non-verbal cues, along with cues from context, semantics and grammar
E. utilize coping skills for dealing with hearing loss

3. Special Facilities and/or Equipment -

Accessible, quiet classroom with assistive listening and/or captioning devices, projector and laptop as needed, adequate lighting, whiteboard or blackboard.

4. Course Content (Body of knowledge) -

This class includes lecture/discussions/practice of all or part of these areas except where indicated:

A. Hearing Loss
    1. Coping skills and adapting the environment to optimize communication, large venue listening devices
    2. Social problems related to hearing loss (lecture/discussion)
    3. Reasonable expectations for hearing aids (lecture/discussion)
    4. Descriptions of medical and audiological procedures relating to hearing loss, mechanics of ear and hearing (lecture/discussion)
B. Lip-Reading
    1. Words in context, utilizing contextual cues and categories
    2. Words in isolation and homophenes
    3. Easily visible consonants and the cues related to their production
    4. Verbal and non-verbal cues
    5. Features of auditory cues

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Instructor observation of ability to reflect course material
B. Participation in all classroom activities
C. Student self-assessment of ability communicate in adverse listening situations

7. Representative Text(s) -

Dugan, Marcia B. Hearing Loss. Washington, DC: Gallaudet University Press, 2003.
Jeffers, J., and M. Barley. Speechreading (Lipreading). Springfield, IL: Charles C. Thomas Press, 1980.
Mayo Clinic, Audiological Testing Services: www.mayoclinic.org/departments-centers/audiology/florida/services/hearing-tests
Johns Hopkins, Understanding Your Audiogram: www.hopkinsmedicine.org/healthlibrary/conditions/adult/otolaryngology/Understanding_Your_Audiogram_22,UnderstandingYourAudiogram
Interactive website to help students understand the anatomy of the ear: www.amplifon.co.uk/interactive-ear/index.html

Selected articles, websites and other reference materials as assigned by instructor.

8. Disciplines -

Deaf and Hearing Impaired: Disabled Students Programs and Services

9. Method of Instruction -

During periods of instruction the student will be participating in discussions, learning and practicing lip reading techniques, creating and/or

presenting lip reading materials for others to lip read, listening to lectures on topics related to hearing loss and lip reading.

10. Lab Content -

Not applicable.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

Students are expected to write samples of sentence-length or longer in standard conversational English to illustrate various aspects of lip-reading and lip-reading challenges. They are expected to read various articles and books, and view videos pertaining to subject matter covered in class. Outside of class they are expected to practice speechreading (lip-reading) using materials distributed in class, dedicated practice times with friends and family, as well as using video and online materials.

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: ALCB 400C

Course Title: LIP-READING: BACK CONSONANTS & BLENDS

Credit Status:

_____ Credit course
x_____ Noncredit course

Catalog Description:

Designed for adults with acquired, congenital or progressive hearing impairment or who have difficulty hearing in adverse listening conditions. Includes the least visible consonant sounds and blends of consonant sounds in the English language and contrasting the appearance of production of different consonant sounds by the oral structures, including cues from behind the lips, teeth and face of the speaker. Aspects of hearing and the auditory range of vowel, consonants and music will be discussed. Assistive listening devices for television, adaptive telephones and assistive devices for hard of hearing, such as special alarms and emergency procedures, technology for going to the movies will be discussed along with special features of hearing aids (e.g., variable digital settings, restaurant programs, t-coils, music programs). Practical experience in lip-reading and using adaptive equipment both in and out of class. Speech reading difficult-to-see vowels, consonants and blends.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

x_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

_____ The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided

by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

_____ Transfer
_____ Workforce/CTE
x_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. Developed in response to local resident demand.

Criteria C. Curriculum Standards (please initial as appropriate)

EM ___ The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Ellen Mastman **Date:** 1-10-18

Division Curriculum Representative: Ben Schwartzman **Date:** 1-10-18

Date of Approval by Division Curriculum Committee: 11-28-17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Student Resource and Support Programs

ALCB 400C LIP-READING: BACK CONSONANTS & BLENDS

Edit Course Outline

ALCB 400C LIP-READING: BACK CONSONANTS & BLENDS **Summer 2018**

24 hours total. **0 Units**

Repeatability -

Statement: Unlimited Repeatability.

Criteria: Course materials change each time with updated language samples and new discussions about innovations in hearing loss technology. For example, there are always new examples of usages of relatively difficult to see vowels, blended consonants, co-articulated consonants and vowels, and subtly visible consonant sounds. One example of changes in hearing technology is the recent passage by Congress to allow Over-the-Counter hearing aid sales, revolutionizing the way hearing aids can be marketed.

Status -

Course Status: Active **Grading:** No Credit

Degree Status: Non-Applicable **Credit Status:** Non-Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:** 4-17-14

Division Dean Information -

Seat Count: 20 **Load Factor:** .030 **FOAP Code:** 122010131051493000

Instruction Office Information -

FSA Code: 3700 - OAS/LIFE LONG LEARNING

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. Developed in response to local resident demand.

1. Description -

Designed for adults with acquired, congenital or progressive hearing impairment or who have difficulty hearing in adverse listening conditions. Includes the least visible consonant sounds and blends of consonant sounds in the English language and contrasting the appearance of production of different consonant sounds by the oral structures, including cues from behind the lips, teeth and face of the speaker. Aspects of hearing and the auditory range of vowel, consonants and music will be discussed. Assistive listening devices for television, adaptive telephones and assistive devices for hard of hearing, such as special alarms and emergency procedures, technology for going to the movies will be discussed along with special features of hearing aids (e.g., variable digital settings, restaurant programs, t-coils, music programs). Practical experience in lip-reading and using adaptive equipment both in and out of class. Speech reading difficult-to-see vowels, consonants and blends.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

A. increase the probability of being able to identify and/or discriminate difficult-to-distinguish consonant and vowel sounds of English, as well as consonant blends (e.g., /k/, /i/ as in "kick", /bl/ as in "black", etc.)
B. demonstrate improved ability to follow conversations, presentations and discussions using auditory and visual cues
C. demonstrate improved ability to focus on one person's speech, ignoring background noise
D. communicate receptively using vowels, consonants and consonant blends with low visibility as verbal/non-verbal cues,and predicting the presence of non-/less-visible speech sounds
E. utilize coping skills and personal technology for dealing with the repercussions of hearing loss in daily living

3. Special Facilities and/or Equipment -

Accessible, mostly quiet classroom with assistive listening devices or captioning as needed, adequate lighting, whiteboard or blackboard, electrical outlet and screen or wall for projected or video materials.

4. Course Content (Body of knowledge) -

This class includes lecture/discussions/labs of all or part of these areas:

A. Hearing Loss
    1. Coping skills and adapting the environment to optimize communication, television, telephone, alerting and alarm devices, service dogs, CART
    2. Social problems related to hearing loss (lecture/discussion)
    3. Reasonable expectations for hearing aids and new and advanced features of hearing aids (lecture/discussion)
    4. Descriptions of speech process as it affects efforts at speech reading
B. Lip-Reading
    1. Words in context, utilizing contextual cues
    2. Words in isolation
    3. Difficult-to-see vowels and consonants, their production and the cues related to their production that increase probability of understanding
    4. Verbal and non-verbal cues
    5. Auditory cues

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Instructor observation of ability to reflect course material
B. Participation in all classroom activities
C. Post-test on last day of quarter

7. Representative Text(s) -

Dugan, Marcia B. Hearing Loss. Washington, DC: Gallaudet University Press, 2003.
Jeffers, J., and M. Barley. Speechreading (Lipreading). Springfield, IL: Charles C. Thomas Press, 1980.
Mayo Clinic, Audiological Testing Services: www.mayoclinic.org/departments-centers/audiology/florida/services/hearing-tests
Johns Hopkins, Understanding Your Audiogram:
www.hopkinsmedicine.org/healthlibrary/conditions/adult/otolaryngology/Understanding_Your_Audiogram_22,UnderstandingYourAudiogram

Although these texts are older than the suggested "5 years or newer standard," these are seminal texts for teaching lip-reading and

speechreading.

Selected articles, websites and other reference materials as assigned by instructor.

8. Disciplines -

Deaf and Hearing Impaired: Disabled Students Programs and Services

9. Method of Instruction -

During periods of instruction the student will be participating in discussions, learning and practicing lip-reading techniques, presenting lip-reading materials for others to lip-read, listening to and watching lectures or watching media on topics related to hearing, hearing loss and lip-reading.

10. Lab Content -

Student practice in lip-reading techniques with instructor or other students in class, with instructor observations and feedback/corrections for improvement of proficiency.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

Students are expected to write samples of sentence-length or longer in standard conversational English to illustrate various aspects of lip-reading and lip-reading challenges. They are expected to read various articles and books, and view videos pertaining to subject matter covered in class. Outside of class they are expected to practice speechreading (lip-reading) using materials distributed in class, dedicated practice times with friends and family, as well as using video and online materials. Students are encouraged to find examples of information from the media about new developments/research pertinent to hearing loss to share in class.

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

FOOTHILL COLLEGE
Stand-Alone Course Approval Request

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Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: ALCB 400E

Course Title: LITERARY LIP-READING

Credit Status:

_____ Credit course
x_____ Noncredit course

Catalog Description:

Advanced instruction in lip-reading techniques for the hard of hearing adult. Practice in lip-reading/speechreading using group discussion of readings presented in class by a variety of speech models. Emphasis on speechreading language samples that vary in length from one word to one paragraph with or with out context, sometimes presented partially aloud, sometimes in complete silence. Additional focus on utilization of extensive contextual cues and use of short- and long-term memory to help with speech understanding, as well as focus on homophene review and visibility of articulation of speech sounds, visible discrimination of speech sounds. Lip-reading materials will consist of the reading of books, short stories or articles written in contemporary American English read together in class, suggested by students and selected by the instructor or by a vote of the students.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

x_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

_____ The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability.

Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

_____ Transfer
_____ Workforce/CTE
x Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. The courses were developed in response to site coordinator requests, based upon individual site need and demands from local residents.

Criteria C. Curriculum Standards (please initial as appropriate)

EM The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Ellen Mastman **Date:** 1-10-18

Division Curriculum Representative: Ben Schwartzman **Date:** 1-10-18

Date of Approval by Division Curriculum Committee: 11-28-17

College Curriculum Co-Chairperson: _____ **Date:** _____

Student Resource and Support Programs

ALCB 400E LITERARY LIP-READING

Edit Course Outline

ALCB 400E LITERARY LIP-READING **Summer 2018**

24 hours total. **0 Units**

Repeatability -

Statement: Unlimited Repeatability.

Criteria: A. Student requests more practice sessions to maintain acquired skills. 1. New lipreading materials presented provide new challenges in speechreading in quiet and noise. 2. New developments in fields relating to hearing loss. 3. Dedicated speechreading practice time provided with various speech models at times that remove pressures of processing everyday communication in real life situations by removing the need to respond and react to messages and requiring demonstration of understanding spoken communications. Students should grow in awareness of production of spoken English speech sounds, individual styles and features of the speakers in the student's home life and changes and developments in treatment of hearing loss and hearing technology.

Status -

Course Status: Active **Grading:** No Credit

Degree Status: Non-Applicable **Credit Status:** Non-Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:** 4-17-14

Division Dean Information -

Seat Count: 20 **Load Factor:** .030 **FOAP Code:** 122010131051493000

Instruction Office Information -

FSA Code: 3700 - OAS/LIFE LONG LEARNING

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This specialized course is one of the Community Based enrichment and lifelong learning options offered in senior centers/residences and other community sites throughout the local area. The courses were developed in response to site coordinator requests, based upon individual site need and demands from local residents.

1. Description -

Advanced instruction in lip-reading techniques for the hard of hearing adult. Practice in lip-reading/speechreading using group discussion of readings presented in class by a variety of speech models. Emphasis on speechreading language samples that vary in length from one word to one paragraph with or with out context, sometimes presented partially aloud, sometimes in complete silence. Additional focus on utilization of extensive contextual cues and use of short- and long-term memory to help with speech understanding, as well as focus on homophene review and visibility of articulation of speech sounds, visible discrimination of speech sounds. Lip-reading materials will consist of the reading of books, short stories or articles written in contemporary American English read together in class, suggested by students and selected by the instructor or by a vote of the students.

Prerequisite: None

Co-requisite: None

Advisory: Students are advised to set aside short dedicated periods of time each day for lip-reading practice with others or in-mirror practice.

2. Course Objectives -

The student will be able to:

A. Demonstrate speechreading: full face and side view.
B. Demonstrate speechreading: visible sounds.
C. Implement contextual cues to increase speechreading of invisible speech sounds.
D. Implement assertive techniques to ease communication obstacles caused by speaker habits and environment.
E. Request and utilize assistive listening devices when needed in public venues, classes, group conversation, etc.

3. Special Facilities and/or Equipment -

Accessible classroom with assistive listening devices and captioning as needed, adequate lighting with control for backlighting, whiteboard or blackboard, electrical outlets for projection of materials and computers when needed. Materials to use for lip-reading/speechreading practice.

4. Course Content (Body of knowledge) -

A. Lip-reading/speechreading
    1. Receptive speechreading full face and varied side views and distances, varied materials
    2. Receptive speechreading using contextual cues, varied speakers and spoken materials
    3. Receptive speechreading using environmental cues; varied speakers, running discourse or extended conversation
B. Hearing loss
    1. Coping techniques involving interpersonal interaction: (e.g., suggestions to make to help a speaker be more understandable)
    2. Coping techniques involving assistive technology and hearing aids (e.g., asking for assistive listening device at theater or asking for preferred seating)
    3. Occasional discussion of new technology and developments in hearing, hearing loss and other pertinent topics

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Achievement of course objectives as reflected on Student Educational Contract

B. Instructor observation of ability to reflect course material
C. Participation in all classroom activities

7. Representative Text(s) -

Carter, Betty Woerner. I Can't Hear You in the Dark: How to Learn and Teach Lipreading. Springfield, IL: Charles C. Thomas Publisher, 1998.
Kaplan, H., C. Garretson, and S. Bally. Speechreading: A Way to Improve Understanding. Washington, DC: Gallaudet University Press, 1985.
Scharper, Diane, and Phillip Scharper. Reading Lips and Other Ways to Overcome a Disability. Loyola University of Maryland, Baltimore, MD: Apprentice House, 2009.

Although these texts are older than the suggested "5 years or newer standard," these are seminal texts for teaching lip-reading and speechreading.

Other assigned readings may include:
Journals, such as On the Level, the Quarterly Newsletter of the Vestibular Disorders Association, and journal of Hearing Loss Association of America, Hearing Loss Magazine.

8. Disciplines -

Deaf and Hearing Impaired: Disabled Students Programs and Services

9. Method of Instruction -

During periods of instruction the student will be watching and interpreting other students as they model speechreading materials, usually paragraphs from contemporary novels and other sources;
the student will be modeling speechreading materials in a manner consistent with optimizing communication for a hard of hearing listener; the student will be listening to lectures and discussions pertinent to the topics of speechreading, hearing loss, listening in challenging environments, managing speakers in conversation and group settings to maximize understanding by hard of hearing listeners. Students will engage in frequent group discussions in a book-group style, for the purpose of highlighting different aspects of lip-reading challenges.

10. Lab Content -

Student practice and demonstrations of speechreading technique, with instructor observations and feedback from both instructor and other students for improving proficiency: a variety of practical situations will be simulated.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Watch television programs with favorite "talking heads," such as news reports and interviews, with volume turned off or very low to practice lip-reading/speechreading in a rapid and challenging listening situation.
B. Create video recordings of favorite news and interview television programs so as to allow the recordings to be watched in silence, played back with sound and then watched in silence again.
C. Using a newspaper or magazine, read to oneself or in a mirror read by a partner to observe the production of certain speech sounds.
D. Practice speechreading with friends and family members several times during the week for the purpose of learning individual characteristics of their appearance while uttering various speech sounds.

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

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Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 22A

Course Title: INTRODUCTION TO REPORTING & NEWSWRITING

Credit Status:

X Credit course
_____ Noncredit course

Catalog Description:

An introduction to gathering, synthesizing/organizing and writing news in journalistic style across multiple platforms. Includes role of the journalist and related legal and ethical issues, including instruction and practice in reporting and the fundamentals of news writing for media, with analysis of typical news stories. Concentration on the language and style of news writing; organization and structure of news stories; the lead and the basic story types. Students will report and write based on their original interviews and research to produce news content. Experiences may include covering speeches, meetings, and other events, writing under deadline and use of AP Style.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability.

Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE
_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for student news, authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Fine Arts and Communication

JRNL 22A INTRODUCTION TO REPORTING & NEWSWRITING

Edit Course Outline

JRNL 22A **INTRODUCTION TO REPORTING & NEWSWRITING** **Summer 2018**

4 hours lecture, 3 hours laboratory. **5 Units**

Total Contact Hours: 84 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 180 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 4 **Lab Hours:** 3 **Weekly Out of Class Hours:** 8

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: UC/CSU **Validation:** 1/9/18

Division Dean Information -

Seat Count: 30 **Load Factor:** .137 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID: Formerly: JRNL 52A

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a required core course for the forthcoming AA degree in Journalism.

1. Description -

An introduction to gathering, synthesizing/organizing and writing news in journalistic style across multiple platforms. Includes role of the journalist and related legal and ethical issues, including instruction and practice in reporting and the fundamentals of news writing for media, with analysis of typical news stories. Concentration on the language and style of news writing; organization and structure of news stories; the lead and the basic story types. Students will report and write based on their original interviews and research to produce news content. Experiences may include covering speeches, meetings, and other events, writing under deadline and use of AP Style.

Prerequisite: None

Co-requisite: None

Advisory: ENGL 1A or 1AH; not open to students with credit in JRNL 52A.

2. Course Objectives -

The student will be able to:

A. Demonstrate a basic knowledge of the fundamentals of news writing and the organization and structure of news stories, including the basics of news gathering and reporting.
B. Gather, organize and synthesize information to compile into news stories and write the stories.
C. Analyze contemporary issues and apply ethical consideration to news writing.
D. Prepare news stories for converging media.

3. Special Facilities and/or Equipment -

Access to computer word processing software, tape recorder, camera, or other equipment necessary for news gathering and reporting.

4. Course Content (Body of knowledge) -

A. Demonstrate a basic knowledge of the fundamentals of news writing and the organization and structure of news stories, including the basics of news gathering and reporting
    1. Grammar
    2. AP Style
    3. Quotes and attributions
    4. News writing basics
    5. The inverted pyramid
    6. Different lede styles
    7. Reporting with numbers and statistics
    8. Non-sexist and non-discriminatory language
B. Gather, organize and synthesize information to compile into news stories and write the stories
    1. Write lead
    2. Write simple and complex/long-form news articles using the inverted pyramid and other formats under deadline
        a. Informative, analysis, opinion editorial, review, etc.
    3. Develop interview questions and conduct interviews
    4. Covering a speech, event, meeting, or interview
    5. Computer-assisted reporting
    6. Using news releases and wire services
    7. Selecting and using diverse sources
    8. Compiling and editing the story
C. Analyze contemporary issues and apply ethical consideration to news writing
    1. Diversity in reporting (reflecting the community to fairly represent minorities, women, and LGBT sources)
    2. Media legal and ethical issues
    3. Evaluation and selection of news; principles of news judgment
    4. Objectivity and fairness
D. Prepare news stories for converging media platforms
    1. Writing for broadcast and social media
    2. Writing for print
    3. Writing for the internet
        a. Introduction to search engine optimization
E. Laboratory activities: writing assistance for all stages of writing or production, depending on project type

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Writing assignments
B. Style quizzes
C. Exams
D. Critiques; peer critiques
E. Professional protocols (meeting deadlines, attendance, adherence to ethics)

7. Representative Text(s) -

Examples of Primary Texts and References:
Brooks, Brian, et al. News Reporting and Writing. 10th ed. Bedford St. Martin's, 2011.
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2012.
Missouri Group. News Reporting and Writing. Bedford/St. Martin's, 2013.
Mencher, Melvin. Melvin Mencher's News Reporting and Writing. McGraw-Hill, 2013.
Rich, Carole. Writing and Reporting News - A Coaching Method. 5th ed. Cengage Learning, 2013.

Examples of Supporting Texts and References:
Goldstein, Norm. Associated Press Stylebook and Libel Manual. New York: The Associated Press, 2013.
AP Stylebook online. https://www.apstylebook.com/
Kessler, Lauren, and Duncan McDonald. When Words Collide: A Media Writer's Guide to Grammar and Style. 8th ed. Cengage, 2012.
Associated Press. Associate Press Stylebook and Briefing on Media Law. Basic Books.
Strunk, William. The Elements of Style. Tribecka Books.
News U (Poynter News University) offers many free or low cost resources and materials for teachers and students for this course.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

A. Lecture and visual aids
B. Discussion of assigned reading
C. Discussion and problem solving performed in class
D. In-class essays
E. In-class exploration of internet sites
F. Quiz and examination review performed in class
G. Homework and extended projects
H. Guest speakers
I. Collaborative learning and small group exercises

10. Lab Content -

Production of a regular news or feature product with a journalism emphasis by and for students and distributed to a campus or community audience. Some suggested possible lab activities leading toward publication might be (options):

A. Finding stories
B. Reporting and writing news, feature, opinion and sports stories
C. Using video equipment, editing video
D. Using a digital camera and photo editing software
E. Electronically filing stories, photos and other visual media
F. Proofreading, copyediting and improving stories
G. Applying standards, including multiple named sources, adequate lead, spelling, grammar, AP style
H. Using design software
I. Interviewing for news media
J. Role of student media on campus
K. Finding college, expert and real person sources using standard methods, websites and social media
L. Online and multimedia presentation of stories
M. Utilizing journalism resources, such as textbooks, guides and websites to improve skills
N. Understanding and applying ethical standards for news reporting and photojournalism
O. Understanding and applying ethical standards for news reporting
P. Understanding news staff organization
Q. Understanding media law as it applies to journalism
R. Using software and web programs to present stories

S. Exploring careers in news media
T. Exploring entrepreneurial opportunities in news media
U. Using critique and self-critique to improve the product
V. Understanding the business side of student media, such as advertising, promotions, printing and distribution

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Reading approximately 250 pages from a textbook, websites and/or handouts, that include:
    1. Explanations of what constitutes news, the structure of basic news stories, finding sources, interviewing and writing various types of stories
    2. Examples of news stories from professional media that demonstrate good writing, structure, use of sources and style
    3. Explanations of media law and ethics: libel, copyright, privacy, photo alternation, naming sources, avoiding conflict of interest and maintaining objectivity
B. In-class assignments and exercises and a final exam to demonstrate comprehension of journalistic standards and critical thinking as applied to sourcing and writing feature stories
C. Presenting at least one story as an online presentation, such as a webpage or blog with hyperlinks and graphic elements
    1. Writing leads and structuring stories
    2. Using Associated Press Style
    3. Editing for conciseness
    4. Using different styles for broadcast news and online news reporting

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 22B

Course Title: INTERMEDIATE REPORTING/NEWSWRITING

Credit Status:

X Credit course
____ Noncredit course

Catalog Description:

This course is a continuation of the introductory newswriting/reporting courses and focuses on coverage of public affairs beats, including local and regional government, police, courts, and school and city boards. Fundamentals in feature writing for newspapers, magazines and other media with instruction and practice in profile, human interest, consumer and interpretive news features. It includes both on- and off-campus reporting and writing/news presentation for a variety of news purposes and through multiple platforms with practical experience in interviewing, writing special story types and revising.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE
_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Fine Arts and Communication

JRNL 22B INTERMEDIATE REPORTING/NEWSWRITING

Edit Course Outline

JRNL 22B **INTERMEDIATE REPORTING/NEWSWRITING** **Summer 2018**

4 hours lecture, 3 hours laboratory. **5 Units**

Total Contact Hours: 84 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 180 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 4 **Lab Hours:** 3 **Weekly Out of Class Hours:** 8

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: UC/CSU **Validation:** 1/9/18

Division Dean Information -

Seat Count: 30 **Load Factor:** .137 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID: Formerly: JRNL 21A

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a required core course for the forthcoming AA degree in Journalism.

1. Description -

This course is a continuation of the introductory newswriting/reporting course (JRNL 22A) and focuses on coverage of public affairs beats, including local and regional government, police, courts, and school and city boards. Fundamentals in feature writing for newspapers, magazines and other media with instruction and practice in profile, human interest, consumer and interpretive news features. It includes both on- and off-campus reporting and writing/news presentation for a variety of news purposes and through multiple platforms with practical experience in interviewing, writing special story types and revising.

Prerequisite: None

Co-requisite: None

Advisory: ENGL 1A or 1AH; not open to students with credit in JRNL 21A.

2. Course Objectives -

The student will be able to:

A. Demonstrate a basic knowledge of the fundamentals of feature writing and the organization and structure of feature stories
B. Gather, organize and synthesize information to compile into feature stories, and write these stories under deadline pressure
C. Prepare feature stories for converging audiences
D. Create plan for submitting story to freelance market
E. Employ editing techniques and use journalistic style
F. Identify and apply fundamental media law concepts, such as libel and privacy rights, and basic freedom of information tools, including public records and open meeting laws
G. Read and analyze current events news

3. Special Facilities and/or Equipment -

Computer with word processing software and access to the internet, portable tape recorder/camera.

4. Course Content (Body of knowledge) -

A. Demonstrate a basic knowledge of the fundamentals of feature writing and the organization and structure of feature stories
    1. The news peg
    2. Feature leads
    3. Analysis of examples of good feature writing
    4. Recognizing important, compelling details
    5. Types of features: covering city councils, school boards, courts, police, and other local governmental bodies
    6. Difference between hard news story, soft news or feature story, opinion story
    7. The complex, multi-source feature long form story
B. Gather, organize and synthesize information to compile into feature stories, and write these stories under deadline pressure
    1. Report and write multiple on- and off-campus public affairs-type stories, such as coverage of local or regional government, public safety, courts and education
    2. Provide innovative story ideas
    3. Gather information from diverse sources
    4. Practice interviewing, note-taking and fact-checking
    5. Research and develop stories
    6. Conduct professional interviews
    7. Organize notes
C. Prepare feature stories for converging audiences
    1. The profile
    2. The consumer feature
    3. The human interest story
    4. The opinion piece
    5. The me-story (emotional, touching or humorous)
    6. Using social media as a reporting tool
    7. Writing for various publication formats: print, online, multimedia, broadcast, and public relations
    8. Producing stories through audio, video and other multimedia formats
    9. Locate and use diverse human, paper and electronic sources
D. Create plan for submitting story to freelance market

1. Identify markets for freelance opportunities
2. Write query letter and submit story to appropriate market
3. Unusual and minority markets
4. Produce at least one major assignment utilizing basic multimedia skills, such as taking a photograph or capturing an audio/video interview, and/or employing social media or other emerging technology tools

E. Employ editing techniques and use journalistic style
1. Practice revision and copy-editing
2. Apply AP Style

F. Identify and apply fundamental media law concepts, such as libel and privacy rights, and basic freedom of information tools, including public records and open meeting laws
1. Non-sexist, non-biased language
2. Apply ethics codes and practices
3. Open meeting laws, public records and freedom of information requests
4. Other media law concepts: libel and privacy

G. Read and analyze current events news
1. Examine the basic concepts and techniques used in broadcast/webcast news and public relations writing

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Reporting assignments/projects across multiple platforms
B. Quizzes/exams
C. Critiques
D. Peer critiques
E. Adherence to professional protocols (meeting deadlines, attendance, adherence to ethics)

7. Representative Text(s) -

Examples of Primary Texts and References:
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2012.
Friedlander, Edward Jay, and John Lee. Feature Writing for Newspapers and Magazines: The Pursuit of Excellence. 7th ed. Pearson, 2010.
Knight, Robert M. Journalistic Writing: Building the Skills, Honing the Craft. 3rd ed. Marion Press, 2010.
Williams, Eesha. Grassroots Journalism: A Practical Manual. 2012.

Examples of Supporting Texts and References:
Goldstein, Norm. Associated Press Stylebook and Libel Manual. New York: The Associated Press, 2013.
Arnold, George T. Media Writer's Handbook: A Guide to Common Editing and Writing Problems. 6th ed. McGraw-Hill, 2012.
Kessler, Lauren, and Duncan McDonald. When Words Collide: A Media Writer's Guide to Grammar and Style. 8th ed. Cengage, 2012.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

A. Lecture and visual aids
B. Discussion of assigned reading
C. Discussion and problem solving performed in class
D. In-class essays
E. In-class exploration of internet sites
F. Quiz and examination review performed in class
G. Homework and extended projects
H. Guest speakers
I. Collaborative learning and small group exercises

10. Lab Content -

Assist in production of a regular news or feature non-fiction product with a journalism emphasis by and for students and distributed to a campus or community audience. Must include weekly newsgathering activities regardless of publication frequency.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Reading approximately 250 pages from a textbook, websites and/or handouts that include:
   1. Explanation of feature-writing style and leads
   2. Suggestions for finding diverse sources
   3. Examples of high-quality feature stories from professional media
   4. Media ethics and law applied to feature writing and freelance writing

B. Writing five feature stories, including:
   1. A multi-source personal profile
   2. An enterprise story demonstrating choice of diverse, reliable sources
   3. An entertainment review and/or opinion story
   4. A multi-source story that localizes a regional, national or international story

C. In-class assignments and exercises and a final exam to demonstrate comprehension of journalistic standards and critical thinking as applied to sourcing and writing feature stories

D. Presenting at least one story as an online presentation, such as a blog or website with links and graphics

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 60

Course Title: EDITORIAL LEADERSHIP FOR STUDENT NEWS MEDIA

Credit Status:

X Credit course
____ Noncredit course

Catalog Description:

Practical experience in planning, assigning, editing and placing print, video and/or web content as members of the college newspaper, magazine or media staff.

Are you requesting Stand Alone approval for the course on a temporary or permanent basis?

____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE

_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Fine Arts and Communication

JRNL 60 EDITORIAL LEADERSHIP FOR STUDENT NEWS MEDIA

Edit Course Outline

JRNL 60 **EDITORIAL LEADERSHIP FOR STUDENT NEWS MEDIA** **Summer 2018**

6 hours laboratory. **2 Units**

Total Contact Hours: 72 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 0 **Lab Hours:** 6 **Weekly Out of Class Hours:** 0

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Non-Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/6/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .095 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a restricted support course for the forthcoming AA degree in Journalism.

1. Description -

Practical experience in planning, assigning, editing and placing print, video and/or web content as members of the college newspaper, magazine or media staff.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

A. Apply journalistic skills in assigning, editing and placing content for a student media product, such as a newspaper, magazine or website.
B. Apply leadership skills to assigning stories and other content and overseeing reporters, photographers, and other content contributors.
C. Manage content from creation to publication in print or online.

3. Special Facilities and/or Equipment -

A. A classroom/laboratory equipped as a newsroom: computers with word processing, graphic and page layout software; internet access; cameras; telephones; fax machine; portable recorders; references; basic supplies.
B. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

4. Course Content (Body of knowledge) -

A. Apply journalistic skills in assigning, editing and placing content for a student media product, such as a newspaper, magazine or website.
    1. Plan and assign stories to peers (content producers and/or fellow editors).
    2. Complete editing assignments by stated deadlines.
B. Apply leadership skills to assigning stories and other content and overseeing reporters, photographers, and other content contributors.
    1. Research and create assignments appropriate for student media.
    2. Interact with reporters, photographers and other content providers about content, revisions, and deadlines.
    3. Critique and self-critique editing issues in newspapers, magazines, news websites and/or news broadcasts.
C. Manage content from creation to publication in print or online.
    1. Apply conventions of journalistic and AP Style.
    2. Follow ethical and legal guidelines in editing content for student news media.
    3. Apply software and web skills in placing and posting content.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Complete one assignment per week which may include creating assignments, editing and placing content for one or more sections of the student newspaper, website or magazine; comply with deadlines.
B. Demonstrate leadership among peers (reporters, photographers and other content providers) with clear communication on deadlines and revisions.
C. Read about and react to issues concerning newsroom leadership and editing using critical thinking skills.
D. Compile a digital or print portfolio of completed work, including a log of activities with descriptions of learning experiences and time spent on assignments.

7. Representative Text(s) -

Examples of Primary Texts and References:
Associated Press Stylebook and Libel Manual. New York: The Associated Press, 2012.
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2013.
The Script Handbook. Latest ed.

Bowles, Dorothy. Creative Editing. 6th ed. Wadsworth, 2010.

Examples of Supporting Texts and References:
Kanigel, Rachele. The Student Newspaper Survival Guide. 2nd ed. Wiley-Blackwell, 2012.
Yopp, Jan Johnson, et al. Reaching Audiences: A Guide to Media Writing. 5th ed. 2010.
Webster's New World College Dictionary. Recent ed. New York: Macmillian.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

Laboratory experience which involves students in formal exercises of news gathering and reporting activities.

10. Lab Content -

Production of a regular news or feature non-fiction product with a journalism emphasis by and for students and distributed to a campus or community audience. Must include weekly newsgathering activities, regardless of publication frequency.

A. Finding and assigning stories, photos, and graphics for sections, such as news, features, sports and opinions
B. Copy editing and proofreading
C. Managing a student newspaper or news website
D. Responding to reader email, letters, and online comments
E. Demonstrating proper formats to reporters and photographers
F. Demonstrating software and web tools to peers
G. Applying standards, including multiple named sources, adequate lead, spelling, grammar, AP Style
H. Reformatting and placing photos for print or online presentation
I. Choosing and using graphic elements
J. Using page design software
K. Understanding and applying copyright law
L. Understanding ethics and media law as they apply to news websites and social media
M. Using journalistic standards for cropping and editing photos
N. Exploring careers in news media
O. Understanding news staff organization
P. Exploring entrepreneurial opportunities in news media
Q. Understanding media law as it applies to broadcast and video journalism
R. Applying canons of journalism

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Complete one assignment per week which may include creating assignments, editing and placing content for one or more sections of the student newspaper, website or magazine; comply with deadlines.
B. Demonstrate leadership among peers (reporters, photographers and other content providers) with clear communication on deadlines and revisions.
C. Read about and react to issues concerning newsroom leadership and editing using critical thinking skills.
D. Compile a digital or print portfolio of completed work, including a log of activities with descriptions of learning experiences and time spent on assignments.

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 61

Course Title: REPORTING FOR STUDENT NEWS MEDIA

Credit Status:

X Credit course
____ Noncredit course

Catalog Description:

Practical experience contributing as a reporter to the college newspaper and/or digital media as a reporter.

Are you requesting Stand Alone approval for the course on a temporary or permanent basis?

____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE

_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Fine Arts and Communication

JRNL 61 REPORTING FOR STUDENT NEWS MEDIA

Edit Course Outline

JRNL 61 **REPORTING FOR STUDENT NEWS MEDIA** **Summer 2018**

6 hours laboratory. **2 Units**

Total Contact Hours: 72 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 0 **Lab Hours:** 6 **Weekly Out of Class Hours:** 0

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Non-Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/6/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .095 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a restricted support course for the forthcoming AA degree in Journalism.

1. Description -

Practical experience contributing as a reporter to the college newspaper and/or digital media as a reporter.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

A. Communicate with one or more editors to obtain assignments.
B. Produce and contribute appropriate journalistic assignments to the student media.

3. Special Facilities and/or Equipment -

A. Varies with assignment, but may include computer with internet access, camera or drawing tools.
B. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

4. Course Content (Body of knowledge) -

A. Communicate with one or more editors to obtain assignments.
    1. Select assignments from assignment list or discussion with editor(s).
    2. Suggest assignments to editor(s).
B. Produce and contribute appropriate journalistic assignments to the student media.
    1. Report and write for the student newspaper, magazine, or related website following ethical and journalistic guidelines.
    2. Turn in assignments in appropriate format and within stated deadline.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Assignments evaluated based on adherence to reporting guidelines and deadline timeliness.
B. Comprehension tests and a final exam requiring students to identify and demonstrate concepts that have been introduced and studied throughout the course.
C. Evaluation of log report for completeness.

7. Representative Text(s) -

Examples of Primary Texts and References:
The Script Handbook. Latest ed.
Associated Press Stylebook and Libel Manual. New York: The Associated Press, 2012.
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2013.

Examples of Supporting Texts and References:
Kanigel, Rachele. The Student Newspaper Survival Guide. 2nd ed. Wiley-Blackwell, 2011.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

Laboratory experiences which involve students in formal exercises of news gathering and reporting.

10. Lab Content -

Production of a regular news or feature product with a journalism emphasis by and for students and distributed to a campus or community audience. Some suggested possible lab activities leading toward publication might be (options):

A. Finding stories
B. Reporting and writing news, feature, opinion and sports stories
C. Using video equipment, editing video
D. Using a digital camera and photo editing software
E. Electronically filing stories, photos and other visual media
F. Proofreading, copyediting and improving stories
G. Applying standards, including multiple named sources, adequate lead, spelling, grammar, AP Style
H. Using design software
I. Interviewing for news media
J. Role of student media on campus
K. Finding college, expert and real person sources using standard methods, websites and social media
L. Online and multimedia presentation of stories
M. Utilizing journalism resources, such as textbooks, guides and websites to improve skills
N. Understanding and applying ethical standards for news reporting and photojournalism
O. Understanding and applying ethical standards for news reporting
P. Understanding news staff organization
Q. Understanding media law as it applies to journalism
R. Using software and web programs to present stories
S. Exploring careers in news media
T. Exploring entrepreneurial opportunities in news media
U. Using critique and self-critique to improve the product
V. Understanding the business side of student media, such as advertising, promotions, printing and distribution

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Identify, propose and complete one approved assignment per week; submit by deadline.
B. Read about and react to journalistic concepts and issues regarding writing and reporting using critical thinking.
C. Keep a log of activities, learning experiences and time spent on assignments.

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

FOOTHILL COLLEGE
Stand-Alone Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 62

Course Title: DIGITAL PRODUCTION FOR STUDENT MEDIA

Credit Status:

X Credit course
____ Noncredit course

Catalog Description:

Practical experience contributing as a digital content producer to the college news media.

Are you requesting Stand Alone approval for the course on a temporary or permanent basis?

____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE
____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Fine Arts and Communication

JRNL 62 DIGITAL PRODUCTION FOR STUDENT MEDIA

Edit Course Outline

JRNL 62 **DIGITAL PRODUCTION FOR STUDENT MEDIA** **Summer 2018**

6 hours laboratory. **2 Units**

Total Contact Hours: 72 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 0 **Lab Hours:** 6 **Weekly Out of Class Hours:** 0

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: AA Degree

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/6/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .095 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a restricted support course for the forthcoming AA degree in Journalism.

1. Description -

Practical experience contributing as a digital content producer to the college news media.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

A. Communicate with one or more editors to obtain assignments.
B. Produce and contribute appropriate journalistic assignments to the student media.

3. Special Facilities and/or Equipment -

A. Computer with internet access, video camera, basic video editing software.
B. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

4. Course Content (Body of knowledge) -

A. Communicate with one or more editors to obtain assignments.
    1. Select assignments from assignment list or discussion with editor(s).
    2. Suggest assignments to editor(s).
B. Produce and contribute appropriate journalistic assignments to the student media.
    1. Produce content for student news website and social media following ethical and journalistic guidelines.
    2. Turn in assignments in appropriate format and within stated deadline.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Assignments evaluated for adherence to video reporting guidelines and deadline timeliness.
B. Comprehension tests and a final exam requiring students to identify and demonstrate concepts that have been introduced and studied throughout the course.
C. Evaluation of log report for completeness.

7. Representative Text(s) -

Examples of primary texts and references:
The Script Handbook. Latest edition.
The Associated Press Stylebook and Libel Manual. New York: Associated Press, 2012.
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2013.

Examples of supporting texts and references:
Kanigel, Rachele. The Student Newspaper Survival Guide. 2nd ed. Wiley-Blackwell, 2011.
Papper, Robert A. Broadcast News Writing Stylebook. 5th ed. Pearson, 2012.
Kobre, Kenneth. Videojournalism: Multimedia Storytelling. Focal Press, 2012.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

Laboratory experiences which involve students in formal exercises of news gathering and reporting.

10. Lab Content -

Production of a regular news or feature product with a journalism emphasis by and for students and distributed to a campus or community audience. Some suggested possible lab activities leading toward publication might be (options):

A. Finding stories
B. Reporting and writing news, feature, opinion and sports stories
C. Using video equipment, editing video
D. Using a digital camera and photo editing software
E. Electronically filing stories, photos and other visual media
F. Proofreading, copyediting and improving stories
G. Applying standards, including multiple named sources, adequate lead, spelling, grammar, AP style
H. Using design software
I. Interviewing for news media
J. Role of student media on campus
K. Finding college, expert and real person sources using standard methods, websites and social media
L. Online and multimedia presentation of stories
M. Utilizing journalism resources, such as textbooks, guides and websites to improve skills
N. Understanding and applying ethical standards for news reporting and photojournalism
O. Understanding and applying ethical standards for news reporting
P. Understanding news staff organization
Q. Understanding media law as it applies to journalism
R. Using software and web programs to present stories
S. Exploring careers in news media
T. Exploring entrepreneurial opportunities in news media
U. Using critique and self-critique to improve the product
V. Understanding the business side of student media, such as advertising, promotions, printing and distribution

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Identify and complete one approved assignment per week; submit by deadline.
B. Read about and react to journalistic concepts and issues using critical thinking.
C. Keep a log of activities, learning experiences and time spent on assignments.

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

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Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 64

Course Title: PHOTOGRAPHY FOR STUDENT MEDIA

Credit Status:

X Credit course
____ Noncredit course

Catalog Description:

Practical experience contributing as a photographer to the college newspaper and/or digital media as a reporter.

Are you requesting Stand Alone approval for the course on a temporary or permanent basis?

____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE

_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Fine Arts and Communication

JRNL 64 PHOTOGRAPHY FOR STUDENT MEDIA

Edit Course Outline

JRNL 64 **PHOTOGRAPHY FOR STUDENT MEDIA** **Summer 2018**

6 hours laboratory. **2 Units**

Total Contact Hours: 72 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 0 **Lab Hours:** 6 **Weekly Out of Class Hours:** 0

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Non-Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/6/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .095 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course helps to support the creation of student generated news on campus. Additionally, it will be included as a restricted support course for the forthcoming AA degree in Journalism.

1. Description -

Practical experience contributing as a photographer to the college newspaper and/or digital media as a reporter.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

A. Communicate with one or more editors to obtain photography assignments.
B. Produce and contribute appropriate photojournalism assignments to the student media.

3. Special Facilities and/or Equipment -

A. Computer with internet access, camera.
B. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

4. Course Content (Body of knowledge) -

A. Communicate with one or more editors to obtain photography assignments.
    1. Select assignments from assignment list or discussion with editor(s).
    2. Suggest assignments to editor(s).
B. Produce and contribute appropriate photojournalism assignments to the student media.
    1. Complete photo assignments for the student newspaper, magazine, or related website following ethical and journalistic guidelines.
    2. Turn in assignments in appropriate format and within stated deadline.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

A. Assignments evaluated for adherence to photojournalism guidelines and deadline timeliness.
B. Comprehension tests and a final exam requiring students to identify and demonstrate concepts that have been introduced and studied throughout the course.
C. Evaluation of log report for completeness.

7. Representative Text(s) -

Examples of Primary Texts and References:
The Script Handbook. Latest ed.
Associated Press Stylebook and Libel Manual. New York: The Associated Press, 2012.
Harrower, Tim. Inside Reporting. 3rd ed. McGraw-Hill, 2013.

Examples of Supporting Texts and References:
Kanigel, Rachele. The Student Newspaper Survival Guide. 2nd ed. Wiley-Blackwell, 2011.
Kobre, Kenneth. Photojournalism: The Professionals' Approach. 6th ed. Taylor & Francis, 2008.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

Laboratory experiences which involve students in formal exercises of news gathering and reporting.

10. Lab Content -

Production of a regular news or feature product with a journalism emphasis by and for students and distributed to a campus or community audience. Some suggested possible lab activities leading toward publication might be (options):

A. Finding stories
B. Reporting and writing news, feature, opinion and sports stories
C. Using video equipment, editing video
D. Using a digital camera and photo editing software
E. Electronically filing stories, photos and other visual media
F. Proofreading, copyediting and improving stories
G. Applying standards, including multiple named sources, adequate lead, spelling, grammar, AP Style
H. Using design software
I. Interviewing for news media
J. Role of student media on campus
K. Finding college, expert and real person sources using standard methods, websites and social media
L. Online and multimedia presentation of stories
M. Utilizing journalism resources, such as textbooks, guides and websites to improve skills
N. Understanding and applying ethical standards for news reporting and photojournalism
O. Understanding and applying ethical standards for news reporting
P. Understanding news staff organization
Q. Understanding media law as it applies to journalism
R. Using software and web programs to present stories
S. Exploring careers in news media
T. Exploring entrepreneurial opportunities in news media
U. Using critique and self-critique to improve the product
V. Understanding the business side of student media, such as advertising, promotions, printing and distribution

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Identify, propose and complete one approved photography assignment per week; submit by deadline.
B. Read about and react to journalistic concepts and issues regarding photography, using critical thinking.
C. Keep a log of activities, learning experiences and time spent on assignments.

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FOOTHILL COLLEGE
Stand-Alone Course Approval Request

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Per our local process, the same process of review and approval is used for noncredit Stand Alone courses.

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process.

Course #: JRNL 70R, 71R, 72R, 73R (series)

Course Title: INDEPENDENT STUDY IN JOURNALISM

Credit Status:

X Credit course
_____ Noncredit course

Catalog Description:

Provides an opportunity for the student to expand their studies in Journalism beyond the classroom by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of Independent Study per department.

Are you requesting Stand Alone approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate, nor to the Foothill GE pattern

X The course will be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Journalism

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  Workforce/Transfer Plan in Development: Will apply this year (2018) for next (2018-19)

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following criteria:

Criteria A. Appropriateness to Mission

The Foothill College Mission states: Believing a well-educated population is essential to sustaining and enhancing a democratic society, Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. We work to obtain equity in achievement of student outcomes for all California student populations, and are guided by our core values of honesty, integrity, trust, openness, transparency, forgiveness, and sustainability. Foothill College offers associate degrees and certificates in multiple disciplines, and a baccalaureate degree in dental hygiene.

Please indicate how your course supports the Foothill College Mission (select all that apply):

X Transfer
X Workforce/CTE
_____ Basic Skills

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area. Please provide evidence of the need or demand for your course, such as ASSIST documentation for transfer courses or Labor Market Information for workforce/CTE courses (if LMI is unavailable, advisory board minutes or employer surveys may be submitted). For basic skills courses, assessment-related data or information may be provided.

Evidence may be attached to this form or provided in the box below.

Citizenship, community building, provides functional support for Foothill student newspaper Online/Print (The Script), authentic learning, vocational training.

Criteria C. Curriculum Standards (please initial as appropriate)

X The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

Faculty Requestor: Brian Lewis **Date:** 12/26/17

Division Curriculum Representative: Mark Anderson **Date:** 1/10/18

Date of Approval by Division Curriculum Committee: 12/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Fine Arts and Communication

JRNL 70R INDEPENDENT STUDY IN JOURNALISM

Edit Course Outline

JRNL 70R **INDEPENDENT STUDY IN JOURNALISM** **Summer 2018**

3 hours laboratory per week. **1 Unit**

Total Contact Hours: 36 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 36 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 0 **Lab Hours:** 3 **Weekly Out of Class Hours:** 0

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade Only

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/6/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .000 **FOAP Code:** 114000143131060100

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course provides the student an opportunity to expand on topics beyond the classroom.

1. Description -

Provides an opportunity for the student to expand their studies in Journalism beyond the classroom by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of Independent Study per department.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

A. Plan an independent study project in Journalism.
B. Conduct the study by means of literature research, fieldwork, or laboratory work, or other means mutually agreed upon in the student-faculty contract as appropriate for the discipline.
C. Present the results of the study in a written or oral report or by some other means as determined by the contract.

3. Special Facilities and/or Equipment -

Not applicable.

4. Course Content (Body of knowledge) -

This course is based on independent research or course of study related to the topics outlined in the student contract.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

Evaluation is based on the completion of the scope of work described in the student-faculty contract.

7. Representative Text(s) -

Texts will vary with content.

8. Disciplines -

Communication Studies OR English OR Journalism

9. Method of Instruction -

Independent study as defined in the student-faculty contract.

10. Lab Content - No content

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

This course requires research, analysis, field study, portfolio or other independent assignments of an agreed upon college-level subject.

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FOOTHILL COLLEGE
Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: LINC 77

Course Title: Design Thinking Overview

Catalog Description:

Students learn an overview of the design thinking methodology and its applications in education, business, industry and government. Focus is on introducing all aspects of the design cycle through inquiry-based facilitation and engaging immersive activities to develop understanding of the design thinking process.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

X The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Makerspace Specialist

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  It is in development and should be submitted by May 15, 2018.

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

Offers academic and vocational instruction to those interested in working in education, government, business, and/or industry. The best case uses for design thinking include solving complex problems and finding desirable solutions for future clients.

NOTE: *Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).*

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Attachments:

- Academic Research: What is Design Thinking and Why Is It Important? – Rim Razzouk, Valerie Shute, Florida State University
- Article: The Importance of Design Thinking – Aaron Shapland, Business 2 Community
- Job listing: Indeed.com: Design Thinking; Los Altos, CA: Current Openings: 1,731

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

ld The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

_____ This is a non-degree applicable credit course (specify which one, below)

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- _____ course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
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Criteria D. Adequate Resources (please initial as appropriate)

ld This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

ld The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Lisa DeLapo **Date:** 10/25/17

Division Curriculum Representative: Bill Ziegenhorn **Date:** 12/1/17

Date of Approval by Division Curriculum Committee: 12/1/17

College Curriculum Co-Chairperson: _____ **Date:**

What Is Design Thinking and Why Is It Important?

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What Is Design Thinking and Why Is It Important?

Rim Razzouk, Valerie Shute
Florida State University

Design thinking is generally defined as an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign. Several characteristics (e.g., visualization, creativity) that a good design thinker should possess have been identified from the literature. The primary purpose of this article is to summarize and synthesize the research on design thinking to (a) better understand its characteristics and processes, as well as the differences between novice and expert design thinkers, and (b) apply the findings from the literature regarding the application of design thinking to our educational system. The authors' overarching goal is to identify the features and characteristics of design thinking and discuss its importance in promoting students' problem-solving skills in the 21st century.

KEYWORDS: design thinking, design process, expertise, expert and novice.

Being successful in today's highly technological and globally competitive world requires a person to develop and use a different set of skills than were needed before (Shute & Becker, 2010). One of these skills is called design thinking. Design has been widely considered to be the central or distinguishing activity of engineering (Simon, 1996). It has also been said that engineering programs should graduate engineers who can design effective solutions to meet social needs (Evans, McNeill, & Beakley, 1990). Like problem solving, design is a natural and ubiquitous human activity. Needs and dissatisfaction with the current state combined with a determination that some action must be taken to solve the problem is the start of a design process. In this view, many scientists have been designing and acting as designers throughout their careers, albeit often not being aware of or recognizing that they are performing in a design process (Braha & Maimon, 1997).

According to Braha and Maimon (1997), engineering lacks sufficient scientific foundations. Historically, engineering curricula have been based on models that are devoted to basic science, where students apply scientific principles to technological problems. However, this practice produces engineering graduates who were perceived by industry and academia as being unable to practice in industry. This concern caused leaders of engineering departments and colleges to recognize

the intellectual complexities and resources demanded to support good design education (Todd & Magleby, 2004). This awareness has resulted in the improvement of existing courses to include industry-sponsored projects where companies provide real problems along with real-world expertise (Bright, 1994; Dutson, Todd, Magleby, & Sorensen, 1997).

Design thinking has also started to receive increased attention in business settings. This is because the design of products and services is a major component of business competitiveness, to the extent that many known companies have committed themselves to becoming design leaders (Dunne & Martin, 2006). And although design thinking has become an integral part of the design and engineering fields as well as business, it can also have a positive influence on 21st century education across disciplines because it involves creative thinking in generating solutions for problems. That is, in academic environments, students are required to read critically, think and reason logically, and solve complex problems (Rotherham & Willingham, 2009). Thus, to help students succeed in this interconnected, digital world we live in, educators should support students in developing and honing 21st-century skills (e.g., design thinking, systems thinking, and teamwork skills) that enhance their problem-solving skills and prepare them for college and career (Rotherham & Willingham, 2009; Shute & Torres, 2012).

These skills are consistent with the theoretical traditions of situated cognition (Lave & Wenger, 1991), developmental theories (Piaget, 1972), and constructivism (Bruner, 1990). What's new is the growing extent to which individual and collective success is seen as depending on having such skills. In addition to business settings, design thinking has received a lot of attention in engineering, architecture, and design majors in universities because it can change how people learn and solve problems (e.g., Dym, Agogino, Eris, Frey, & Leifer, 2005; Fricke, 1999; Nagai & Nagouchi, 2003). The topic of expertise in design has also been receiving increasing attention in design research. In support of these claims, consider the large number of research articles published on the topic of design thinking (e.g., Do & Gross, 2001; Goldschmidt & Weil, 1998; Owen, 2007; Stempfle & Badke-Schaube, 2002; Tang & Gero, 2001). Among these research papers, there are studies of expert or experienced designers and comparisons of the processes of novice versus expert designers (e.g., Cross & Cross, 1998; Ericsson & Smith, 1991; Ho, 2001). Within this large body of design thinking research, experimental and quasi-experimental studies are lacking. Most, if not all of the studies are qualitative.

Goals and Focus

The dual aims of this article are to (a) summarize findings from the literature of design thinking to gain better understanding of its characteristics, processes, and differences between novice and expert design thinkers and (b) apply the findings from the literature regarding design thinking to our educational system. Our overarching goal is to identify the features and characteristics of design thinking and show its importance in promoting students' problem-solving skills needed to succeed in the 21st century. The major questions addressed in this review include (a) What are the characteristics of design thinking, (b) what are the differences between a novice and an expert design thinker, and (c) why is design thinking important?

TABLE 1
Databases used in searching for articles

Database and Web sites	Description
ERIC	A database that provides extensive access to education-related literature from the following two printed journals: *Resources in Education* (*RIE*) and *Current Index to Journals in Education* (*CIJE*).
JSTOR	A database of back issues of core journals in the humanities, social sciences, and sciences. The gap between the most recently published issue of any journal and the date of the most recent issue available in JSTOR is from 2 to 5 years.
ScienceDirect	One of the largest online collections of published scientific research. It is operated by the publisher Elsevier and contains nearly 10 million articles from over 2,500 journals and over 6,000 e-books, reference works, book series, and handbooks.
IEEE Xplore	A database that indexes, abstracts, and provides full-text for articles and papers on computer science, electrical engineering, and electronics. The database mainly covers material from the Institute of Electrical and Electronics Engineers (IEEE) and the Institution of Engineering and Technology (IET). The IEEE Xplore database contains over 2 million records.
Google Scholar	Google Scholar was employed to search for and acquire specific references. Google Scholar is a Web site providing peer-reviewed papers, theses, books, abstracts, and articles from academic publishers, professional societies, preprint repositories, universities, and other scholarly organizations.

Method

Many articles in the design thinking literature were identified and then collected. Table 1 lists and describes the online databases and Web sites that were employed in this search-collection effort. The focus of the search was to access full-text documents using various search terms or keywords such as *design thinking, design cognition, design behavior, design studying, design reasoning, design process, thinking of design, visual thinking*, and *prototyping*. The search was not limited to a particular date range or experimental studies. However, slight preference was given to more recent research. In all, approximately 150 documents were collected. From this set, a total of more than 45 documents met the criteria for inclusion in the literature review. The inclusion criteria consisted of topical relevancy of documents to the research questions in this article (e.g., design thinking characteristics and processes, novice vs. expert design thinker, and the importance of design thinking). Both experimental and nonexperimental studies were included in this article.

Literature Review

Many authors have written about the nature of and different processes underlying the design thinking process (e.g., Liu, 1996; Owen, 2007; Stempfle & Badke-Schaube, 2002). We now present our review of the literature of this area, starting with a description of the nature of design thinking, its characteristics, and processes. Next, we present literature regarding expertise, expert versus novice design thinkers, and expertise in design. We then present our design thinking model adapted from Shute and Torres (2012). Finally, we discuss the findings from the literature, showing the importance of design thinking and providing suggestions for future research.

Nature of Design Thinking

In many fields, knowledge is generated and accumulated through action (i.e., doing something and evaluating the results). That is, knowledge is used to produce work, and work is evaluated to produce knowledge. Creative people tend to work in two different ways: either as finders or as makers (Owen, 2007). Finders demonstrate their creativity through discovery. They are driven to understand and to find explanations for phenomena not well understood. Makers are equally creative, but they are driven to synthesize what they know in new constructions, arrangements, patterns, compositions, and concepts. Given the fundamental process differences between how finders and makers think and work, other factors might similarly reveal differences among professional fields and therefore help to define the nature of design thinking. One such factor is the content with which a field works.

A conceptual map can be drawn to represent both content and process factors (Figure 1). Two axes define the map. Separating the map into left and right halves is an analytic/synthetic axis that classifies fields by process (i.e., the way they work). Fields on the left side of the axis are more concerned with finding or discovering; fields on the right are concerned with making and inventing. A symbolic/real axis divides the map into halves vertically. Fields in the upper half of the map are more concerned with the abstract, symbolic world, as well as the institutions, policies, and language tools that enable people to manipulate information, communicate, and live together. Fields in the lower half are concerned with the real world and the artifacts and systems necessary for managing the physical environment (Owen, 2007).

Four quadrants result from this division. The first is *analytic/symbolic*, which includes fields like science that are heavily analytic in their use of process and their content is more symbolic than real in that subject matter is usually abstracted in its analyses. The second quadrant is *synthetic/symbolic*, which includes fields that are concerned extensively with the symbolic content and synthetic processes. For instance, law falls in this quadrant because it is concerned with the symbolic content of policies and social relationships, and most of its disciplines are concerned with the creation of laws. The third quadrant is *analytic/real*, which on the content scale involves reality and on the process scale is strongly analytic. Medicine, for example, falls into this quadrant because it is highly concerned with real problems of human health and diagnostic processes are its primary focus. The fourth is *synthetic/real*, which involves fields, such as design, that include synthesis processes and real content (Owen, 2007).

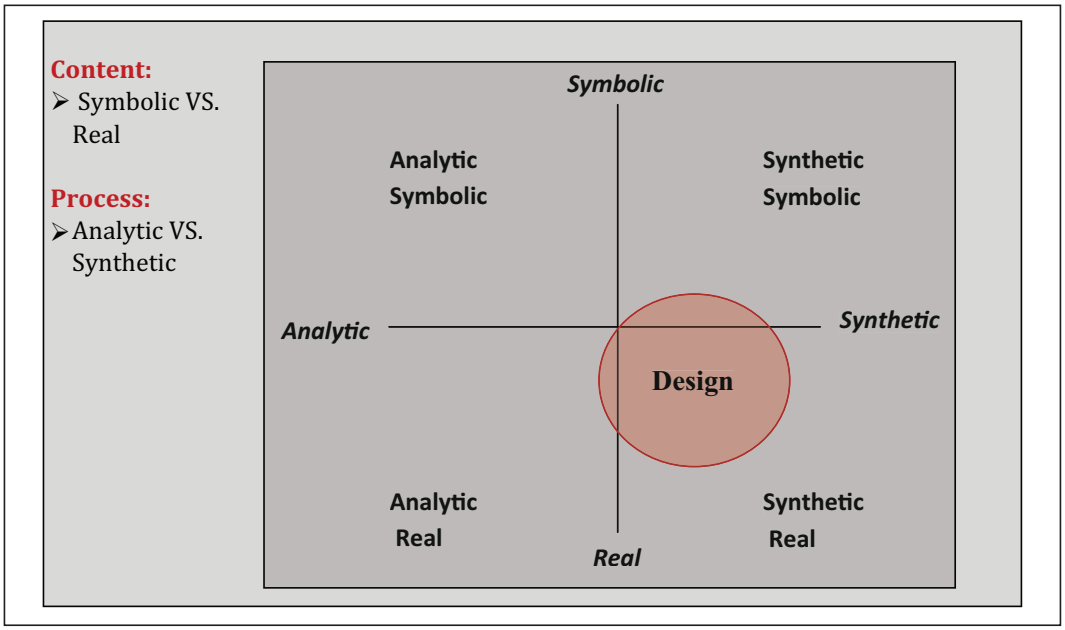

FIGURE 1. *Conceptual representation of content and process factors.*
Note. Adapted from "Design Thinking: Notes on Its Nature and Use," by C. Owen, 2007. *Design Research Quarterly, 2*(1), 16–27.

In this mapping (represented by a circle), design falls in the fourth quadrant because it is highly synthetic and strongly concerned with real-world subject matter. However, because disciplines of design deal with communications and symbolism, design has a symbolic component, and because design requires analysis to perform synthesis, there is also an analytic component (Owen, 2007).

It is important to note that a case can be made for the positioning of any field to the left or the right of the map. However, mapping fields is relative and not absolute, which is important because this mapping provides a means for comparing the relationships among different fields with respect to the two dimensions: content and process. Each of the four quadrants in this figure is important in education because we want our students to develop higher-order thinking skills and be able to analyze, synthesize, innovate, and thus readily deal with real-world problems.

According to Hatchuel and Weil (2009), design can be modeled as a relationship between two interdependent spaces with different structures and logic: the space of concepts (C) and the space of knowledge (K). Space K contains all established knowledge available for designers, while Space C includes concepts that are neither true nor false in K about an object. Design proceeds in a step-by-step partitioning of C-sets until a partitioned C-set becomes a K-set, that is, a set of objects, well defined by a true proposition in K. Thus, for Hatchuel and Weil, design is a reasoning activity that starts with a concept about a partially unknown object and attempts to expand it into other concepts and/or new knowledge.

At its core, design thinking refers to how designers *see* and how they consequently *think* (Liu, 1996). It is an iterative and interactive process where designers (a) see what is there in some representation of problem-solving concepts/ideas, (b) draw relations between ideas to solve the problem, and (c) view what has been

drawn as informing further design efforts (Do & Gross, 2001; Lloyd & Scott, 1995). Designing often begins with a diagrammatic depiction that is gradually transformed to more complex graphic representations by adding detail. These design diagrams facilitate the designer's reflection, dialogue, and self-critique and therefore serve the purpose of representing and testing the designer intent. In other words, diagrams serve as a primary vehicle for thinking and solving problems (Do & Gross, 2001; Nagai & Noguchi, 2003).

Braha and Reich (2003) viewed the design process as a generic process where designers modify either the tentative or current design or the requirements and specifications, based on new information that has become available. This ongoing process of modification is performed in order to remove discrepancies and establish a fit between the problem space, expressed through requirements and specifications, and the proposed design solution.

In 2000, Suwa, Gero, and Purcell argued that designing is a situated act, which means that designers invent design issues or requirements in a way that is situated in the environment in which they design. The authors found a strong bidirectional correlation between unexpected discoveries and the invention of issues and requirements. Unexpected discoveries are those instances when a designer perceives something new in a previously drawn element of a solution concept. Not only do unexpected discoveries become the driving force for the invention of issues or requirements, but also the occurrence of invention tends to cause new unexpected discoveries. These results emphasize the importance of rapid alternation between different modes of activity during the design process (e.g., drawing sketches and conceiving of design issues or requirements that are dynamically related to one another). This also explains the opportunistic nature of design activity, as the designer pursues issues and requirements in an evolving solution concept.

According to Dorner (1999), several forms of thinking can be observed in designing. Design starts as a cloudy idea about how the design/product should look like and how it should work. With time, this idea crystallizes and transforms into a clear and complete image of the product. The cloudy idea comes from something that the designer already knows about the product. This knowledge can be a source of analogies. The second form of thinking involves the sketches and models that bring the cloudy idea to a more concrete form. Sketches and models clarify the characteristics of the product, helping to form a specific line of thought that facilitates the development process and forms the basis for the design thinking process. The third form of design thinking is the "picture-word cycle," which involves putting ideas into words that helps the designer clarify and elaborate on ideas. However, whatever the form of thinking, the design thinker should demonstrate specific characteristics in addition to creativity.

Characteristics of a Design Thinker

Table 2 summarizes some of the design thinker characteristics that Owen (2007) described. Although the nature of design thinking and what makes one person a design thinker and another not remain elusive, a number of characteristics have been identified and can be useful in understanding how a design thinker thinks and approaches issues. These characteristics are also helpful in understanding the nature of design thinking. In addition to these characteristics that a design thinker should possess, there are several processes underlying the design thinking process.

TABLE 2
Design-thinker characteristics

Characteristics	Description
Human- and environment-centered concern	Designers must continually consider how what is being created will respond to human needs. They should also consider environmental interests at a level with human interests as primary constraints for the design process.
Ability to visualize	Designers work visually (i.e., depiction of ideas).
Predisposition toward multifunctionality	Designers should look at different/multiple solutions to a problem and keep the big picture of the problem in mind while focusing on its specifics.
Systemic vision	Designers should treat problems as system problems with opportunities for systemic solutions involving different procedures and concepts to create a holistic solution.
Ability to use language as a tool	Designers should be able to verbally explain their creative process forcing invention where detail is lacking and expressing relationships not obvious visually (i.e., explanation should go hand in hand with the creative process).
Affinity for teamwork	Designers need to develop interpersonal skills that allow them to communicate across disciplines and work with other people.
Avoiding the necessity of choice	Designers search competing alternatives before moving to choice making or decision making. They try to find ways to come up with new configurations. This process leads to a solution that avoids decision and combines best possible choices.

Processes in Design Thinking

According to Braha and Reich (2003), the design process is characterized by being iterative, exploratory, and sometimes a chaotic process. It starts from some abstract specifications, or what Hatchuel and Weil (2009, p. 182) call a "brief," and terminates with the description of a product while gradually refining the product specifications. Intermediate states of the design process might include conflicting specifications and product descriptions. Specifications may change in reaction to proposals or to unexpected problems discovered during the process. In this case, design follows cycles of mutual adjustment between specifications and solutions until a final solution is reached (Hatchuel & Weil, 2009).

During the design process, designers engage in several different cognitive processes. Kolodner and Wills (1996) specified three processes required in design

thinking: (a) preparation, (b) assimilation, and (c) strategic control. In the preparation process, designers need to learn what to focus on and what is relevant. During this phase, the specifications and constraints of the problem, reinterpretation of ideas, visualization, problem reformulation (including situation assessment and elaboration), and others evolve. The assimilation process involves making sense of the proposed solution, data, and observations coming from the design environment, such as feedback from experiments with prototypes. In the strategic control process, designers must make many decisions over the course of a design (e.g., which idea to elaborate or adapt next, which constraints to relax, how to set priorities). They also move among various tasks, subproblems, and design processes in a flexible and highly opportunistic manner.

In 2002, Stempfle and Badke-Schaube examined a theory of what design teams actually do while designing. They looked at theories of creativity and problem solving and cognitive theories of human decision making. The basic elements of design thinking that the authors proposed as cognitive operations to deal with any kind of problem were generation, exploration, comparison, and selection. The first two elements (generation and exploration) widen a problem space whereas the last two (comparison and selection) narrow a problem space. When widening a problem, solutions are generated and then examined in relation to the goal. Then, in an iterative process, solutions may be modified or new solutions may be developed until an optimal solution is found. Narrowing a problem entails comparing two or more ideas and then selecting the solutions based on specific and relevant goal criteria. These elements represent a model that can be applied to understand designers' thinking while working in a team. Designers working in groups have to communicate what they are thinking, thus showing their basic thinking processes.

The researchers applied this model to three mechanical engineering teams consisting of four to six students. The teams were assigned to design a mechanical concept for an optical device to project images of celestial objects. The teams interacted with a simulated customer at three fixed points in time during their one-day working period. Team communication was recorded. Results from protocol analysis revealed that the teams spent only 10% of their time on clarifying the goal and spent the remaining 90% of the time planning a solution.

The Stempfle and Badke-Schaube (2002) findings described differ from those observed by McNeill, Gero, and Warren (1998) in electronics engineers. McNeill and colleagues reported that across the whole design episode, the designers spent most of their time analyzing the problem; synthesizing the solution took the second greatest amount of time, and the remaining time was spent on the evaluation of the solution. The authors concluded that a designer begins a conceptual design session by analyzing the functional aspects of the problem. As the session progresses, the designer focuses on the three aspects—function, behavior, and structure—and then engages in a cycle of analysis, synthesis, and evaluation. Toward the end of the design session, the designer's activity is focused on synthesizing structure and evaluating the structure's behavior. Similarly, in a team of three industrial designers, Goldschmidt and Weil (1998) found that the process of design thinking is nonlinear and that designers follow a forward (breaking down) and backward (validating) reasoning strategy. Although research is not consistent about how time is spent during the design thinking process, findings indicate that there is a learning

progression during the design thinking process that eventually transforms a novice into an expert design thinker.

Expertise

Expertise is the result of a dedicated application to a specific field of interest (Cross, 2004). According to Ericsson, Krampe, and Tesch-Romer (1993), deliberate practice guided toward improvement of performance is necessary to reach high levels of performance and the acquisition of expertise. Ericsson et al. added that the achieved level of performance of an expert is closely related to the accumulated amount of practice. Therefore, the development of expertise passes through different phases. Something happens in the development from being a novice to becoming an expert.

The major difference between experts and novices is that experts have accumulated a large number of examples of problems and solutions in a specific domain of interest. A key competency of an expert is the ability to mentally stand back from the specifics of the accumulated examples and form more abstract conceptualizations related to their domain of expertise (Akin & Akin, 1996; Ho, 2001). Experts are believed to be able to store and access information in larger cognitive chunks than novices can and to recognize underlying principles rather than focusing on the surface features of problems (Dorner, 1999; Nigel, 2004; Purcell & Gero, 1996; Suwa et al., 2000). Therefore, the accumulation of experience is critical in the transformation from a novice to an expert.

In many areas, like sports and music, the benefits of dedicated practice are well known and there are established programs of training for novices to help them gain experience and expertise over time (Cross, 2004). It may be beneficial in other areas as well to focus on the transformational phases (i.e., novice through expert), such as in design thinking. In design education, there are well-established practices that are presumed to help the development from novice to expert, but there is still little understanding of the differences between novice and expert performance in design.

Novice Versus Expert Design Thinker

In general, a good designer should be able to flexibly use different problem-solving strategies and choose the one that best meets the requirements of the situation (Akin & Akin, 1996; Eisentraut, 1999; Weth, 1999). Regardless of the given problem, successful designers clarify requirements, actively search for information (i.e., critically check given requirements and question their own requirements), summarize information of the problem into requirements and partially prioritize them, and do not suppress first solution ideas (Badke-Schaub, 1999; Fricke, 1999).

According to Nigel (2004), novice behavior is usually associated with a depth-first approach to problem solving, that is, identifying and exploring sub-solutions in depth and sequentially. The strategies of experts are usually regarded as being predominantly top-down, breadth-first approaches. The expert designer uses explicit problem decomposing strategies, which the novice designer does not possess. In 2001, Ho examined the search strategies used by expert and novice designers in solving problems in industrial design. Using protocol analysis, the researcher found that the novice participant focused only on the surface level without decomposing the problem, while the expert used explicit problem decomposing

strategies. However, both expert and novice used similar bottom-up (working-backward) problem-solving strategies.

Christiaans and Dorst (1992) conducted protocol studies of junior and senior college students in an industrial design course. They found that some students, mostly the juniors, got trapped gathering information rather than progressing to solution generation, but most of the senior students did not face this difficulty. That is, senior design students did not gather as much information, but they were able to solve the given problem. They asked for less information, processed it directly, and built up an image of the problem. They also prioritized activities early in the process.

A similar finding was reported by Gunther and Ehrlenspiel (1999), who conducted a set of experiments with a total of 20 novice and expert designers of mechanical devices. The researchers found that experts were able to clarify a task in a shorter time, whereas novices had to invest much more time in clarification. These findings (i.e., Christiaans & Dorst, 1992; Gunther & Ehrlenspiel, 1999) corroborate findings from Atman, Chimka, Bursic, and Nachtman (1999), who conducted protocol analysis studies of engineering students. They found that novices (i.e., freshmen with no design experience) spent a large portion of their time defining the problem and did not produce high-quality designs. Therefore, and similar to the industrial design students in the Christiaans and Dorst (1992) study, some of the freshmen engineering students in the Atman et al. study were stuck at the level of defining the problem, which hindered their progress in the design process. However, senior students defined the problem adequately, which in turn resulted in good designs.

Ahmed, Wallace, and Blessing (2003) studied differences between the behaviors of novice and experienced designers in engineering. The authors found clear differences between the behavior of new graduate entrants (i.e., novices) to the engineering design profession and experienced designers. The novices used trial-and-error techniques of generating and implementing a design modification, evaluating it, and then generating another evaluation through several iterations. Experienced engineers, however, made a preliminary evaluation of their tentative design decisions before implementing them and making a final evaluation. In contrast to the novices' trial-and-error approach, the experienced designers employed integrated design strategies.

In 2001, Seitamaa-Hakkarainen and Hakkarainen investigated the relationships between visual and technical designing using qualitative analysis. That is, they examined differences between two novices and two experts in the field of weaving design. Protocol analysis results revealed that the experts integrated the visual elements (e.g., color, size, patterns) and technical elements (e.g., material) of weaving, and generally considered them in a parallel way during the design process. Iteration between the visual and the technical space was a significant aspect of the experts' design process. The experts continuously moved from one design space to another to carry out very detailed processes of search for design solutions. In contrast, the novices organized their process around the composition space and rarely moved to the construction space to explore how visual ideas could be realized in weaving.

Similarly, using data from protocol studies, Kavakli and Gero (2002) compared the cognitive performances/actions (i.e., looking, perceptual and functional

actions, and goals) of a novice and an expert architect. Using protocol analysis, the researchers investigated concurrent cognitive actions of designers and found significant differences in output between novice and expert designers. The protocol was divided into segments. A cognitive segment consisted of cognitive actions that appeared to occur simultaneously. They found that the design protocol of the expert included 2,916 actions (i.e., chunks) and 348 segments, whereas the novice's protocol included 1,027 actions and 122 segments. Each segment consisted of 8 cognitive actions on average. Considering that the same amount of time was given to both participants, the expert's design protocol was 2.8 times as rich as the novice's in terms of actions. There were also 2.8 times as many segments in the expert designer's session as in the novice's. Therefore, the expert had more overall fluency in relation to divergent thinking skills. The expert's cognitive actions continuously rose throughout the activity, while the novice's cognitive activity started at a peak and then declined. The authors also found that the expert seemed to have more control of his cognitive activity compared to the novice. Because the expert's cognitive actions are well organized, he was able to govern his performance more efficiently than the novice.

These findings align with those by Tang and Gero (2001), who found substantial differences between a novice and an expert architect. Using a retrospective protocol analysis, the authors found differences between the novice and expert designers in relation to four design levels: (a) the *physical* level, which refers to the instances that have direct relevance to the external world, comprising drawing and looking actions; (b) the *perceptual* level, which concerns the instances of attending to visual-spatial features/relationships in an automatic perceptual mechanism; (c) the *functional* level, which relates to the instances of functional references mapped between visual-spatial features/relationships and abstract concepts, including meanings and functions; and (d) the *conceptual* level, which represents the instances that process abstract concepts and the instances that process physical and perceptual actions. The expert seemed to create more meaning at the physical and perceptual levels than the novice.

Differences between novices and experts performing design-related problems were also studied by Göker (1997). The author examined novices and experts on a task involving computer-simulated construction of machines. Göker found that the experts, skilled in the use of computer simulations, did not reason toward a design concept in an abstract way, but relied more on their experience and visual information. In contrast, novices depended more on abstract reasoning.

Experts During the Design Process

Expert designers solve complex problems more easily than novices (Cross, 2004). During a conceptual design process, experienced designers do not just synthesize solutions that satisfy given requirements, they also invent design issues or requirements that capture important aspects of a given problem that assist in solving the problem at hand (Liu, 1996). From protocol studies of experienced engineering designers, Lloyd and Scott (1994) found that the manner by which experts approach a problem is related to the degree and type of previous experience. More experienced designers tend to use generative reasoning (i.e., an inductive approach) compared to less experienced designers who employ more deductive reasoning (depth-first approach). In other words, designers with specific experiences related

to the problem type approached the design task through solution assumptions/conjectures instead of problem analysis. This hypothesis suggests that experience in a specific problem type enables designers to perceive the design problem in terms of relevant solutions that they have previously encountered.

Designers also tend to change goals and constraints as they design. They are flexible in selecting and trying different solutions. However, when designers face unexpected difficulties and/or shortcomings in the solution concept, they tend to stick to their principal solution concept as long as possible through the design process. For instance, from case studies of professional architectural designers, Rowe (1987) observed that the designers' choices for problem-solving directions were influenced by their initial design ideas. Furthermore, the designers made every effort to make these ideas work whenever a problem was encountered, rather than adopting a new idea.

And although this fixedness proclivity may sound maladaptive, Ullman, Dietterich, and Stauffer (1988) observed the same phenomenon in their protocol studies of experienced mechanical engineering designers. Ullman and colleagues found that experienced designers typically pursued only one design proposal. And even when major problems had been identified, the designers preferred to modify the initial proposal rather than rejecting it and developing a new one. Likewise, Ball, Evans, and Dennis (1994) drew a similar conclusion from their studies of senior electronic engineers conducting real-world projects. The researchers stated that when the designers generated a less than satisfactory solution, they refused to discard the original solution or spend time and effort coming up with an alternative one. Rather, they tended to improve the solution by developing different versions until a workable solution was achieved. Again, the designers indicated a fixation behavior on initial concepts (Ball et al., 1994). Nonetheless, adherence to initial concepts seems to comprise normal expert design behavior. Finally, in a study of experienced software designers, Guindon (1990) also found that designers came to a solution very early in the session and quickly rejected alternative solutions.

Since a problem cannot be fully understood in isolation, expert designers use conjectures as a means of helping them to explore and understand the formulation of the problem. From protocol studies of experienced industrial designers, Dorst and Cross (2001) asserted that the designers start by exploring the problem and find, discover, or recognize a partial structure. Afterwards, they use this partial structure to generate initial ideas for the form of a design concept, then expand and develop the partial structure. Thus, their goal is to create a matching solution to the problem. Having more than one solution concept should stimulate a more comprehensive evaluation and understanding of the problem (Cross, 2004). From the analysis and synthesis of the literature, it appears that there are a number of competencies that designers should acquire and hone. The more experience a designer builds in these competencies, the more he or she advances along the novice-expert continuum.

Design Thinking Competency Model

As a result of this review of the literature, we have created a design thinking competency model (Figure 2), adapted from Shute and Torres (2012). This model displays a hierarchically arrayed set of variables (or nodes), from general to more specific when viewing from left to right. This competency model represents an

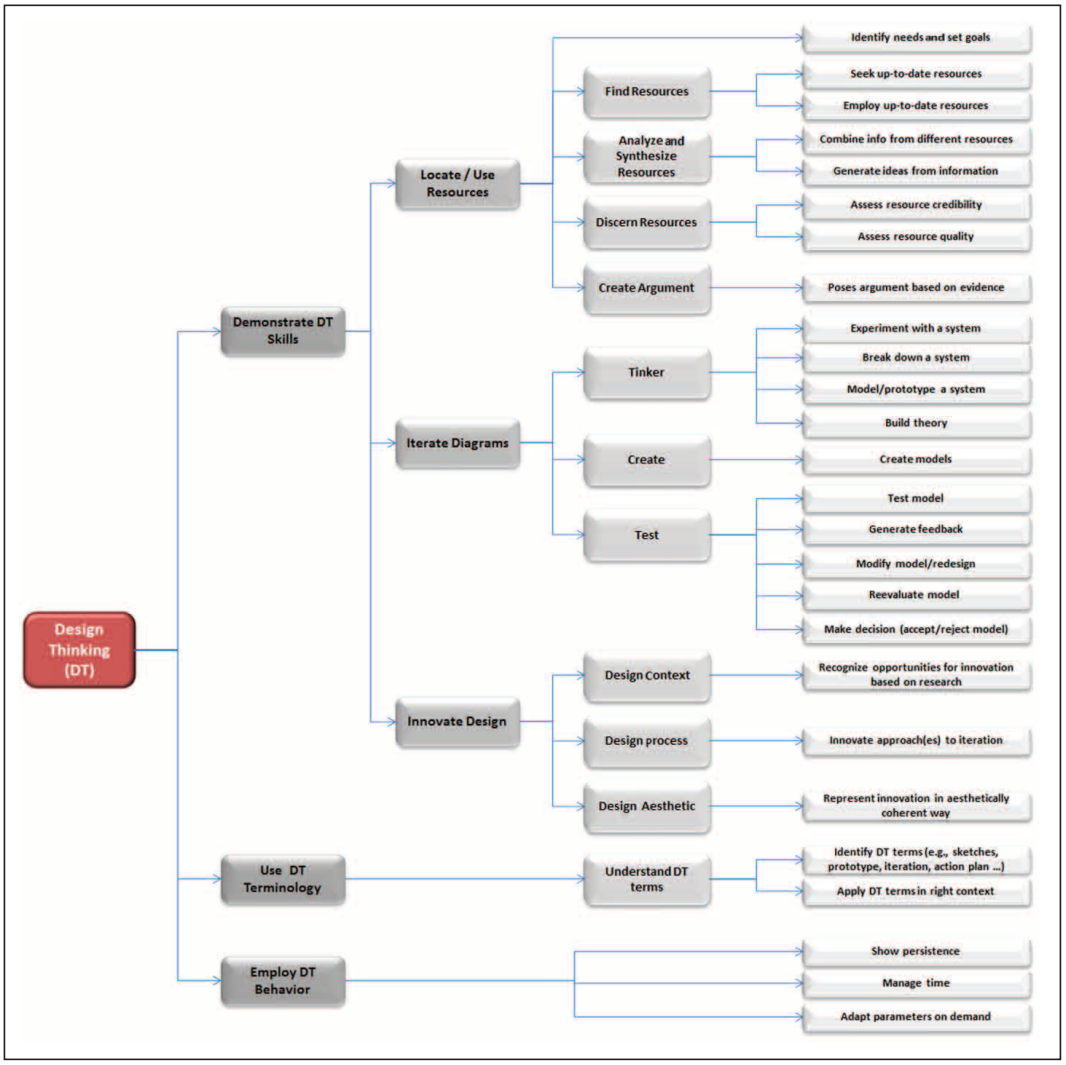

FIGURE 2. *The design thinking competency model.*
Note. Adapted from "Where Streams Converge: Using Evidence-Centered Design to Assess Quest to Learn." In M. Mayrath, J. Clarke-Midura, & D.H. Robinson (Eds.), Technology-Based Assessments for 21st Century-Skills: Theoretical and Practical Implications from Modern Research (pp. 91-124). Charlotte, NC: Information Age Publishing.

operationalization of the design thinking construct and may also help drive the creation of appropriate activities that would allow for the collection of relevant evidence to inform variables in the model. For example, consider the variable "Iterate Diagrams" in Figure 2. Skills associated with this variable include tinkering, creating, and testing ideas via diagrams. Testing, in turn, entails initial testing of the design idea, getting feedback, modifying the design, reevaluating it, and making a decision to accept or reject the modeled idea. To assess students' competency levels relative to the iterate diagrams variable, we would have to put them in a situation in which those constituent skills could be employed, such as in a game or simulation. Diagnostically, the model could provide the framework for evaluating the degree to which students are demonstrating particular design thinking skills at various times and at various grain sizes relative to the model (for more, see Shute & Torres, 2012).

The design thinking competency model is useful for assessment and diagnostic purposes. That is, once the key knowledge and skills have been identified, then tasks and activities can be developed in line with the model's variables. Another relevant question concerns whether these skills are learnable. With sufficient practice within meaningful environments, along with scaffolded support and formative feedback, we believe that students can learn design thinking skills. Moreover, pedagogical approaches that involve problem-based learning, project-based learning, and inquiry-based learning can be used to enhance students' design thinking skills within the context of evocative and consequential classroom activities (Dym et al., 2005).

Such learner-centered approaches can help to raise students' awareness about good design processes and generally enhance their interest in solving complex problems. Associated activities could be designed in a way that requires students to generate ideas/solutions, receive support for their emergent design thinking skills, as well as ongoing feedback about the feasibility of various solutions. Educators can support their students in developing these skills by providing them with multiple and varied opportunities to design and create prototypes, experiment with different ideas, collaborate with others, reflect on their learning, and repeat the cycle while revising and improving each time.

In summary, the premise is that by improving students' design thinking skills through having them apply processes and methods that designers use to ideate and help them experience how designers approach problems to try to solve them, students will be more ready to face problems, think outside of the box, and come up with innovative solutions. We believe that design thinking is more than just a skill to be acquired and used in limited contexts. Rather, we view it as a way of thinking and being that can potentially enhance the epistemological and ontological nature of schooling.

Summary and Discussion

In this article, we reviewed the literature related to design thinking. Expert designers are solution focused rather than problem focused. This appears to be a feature of design thinking that comes with education and experience in designing (Cross, 2004). Specifically, building experience in a particular domain allows designers to quickly identify the problem and propose a solution. Generating, synthesizing, and evaluating a solution are frequently identified as key features of design expertise. Some research studies (e.g., Dorst & Cross, 2001; Guindon, 1990) have found that creative and productive design behavior seems to be associated with frequent switching of types of cognitive activity (e.g., analysis, synthesis). Designers should be able to assess the conditions of a given situation and quickly adjust their actions depending on the current set of needs (Stempfle & Badke-Schaube, 2002).

Helping students to think like designers may better prepare them to deal with difficult situations and to solve complex problems in school, in their careers, and in life in general. Current educational practices, though, typically adhere to outdated theories of learning and pedagogy, evidenced by a so-called content fetish (Gee, 2005). That is, schools continue to focus on increasing students' proficiency in traditional subjects such as math and reading, via didactic approaches, which leaves many students disengaged. We can and should move beyond that limited

focus and consider new educationally valuable skills (e.g., design thinking, multitasking, digital literacy) to value, assess, and support.

As described earlier, enhancing students' design thinking skills may be achieved through incorporating authentic and intriguing tasks into the classroom and providing many opportunities to apply design processes. In our design thinking model shown in Figure 2, imagine tasks that are designed and developed for each of the low-level nodes. As students work on the tasks, evidence is accumulated to evaluate their performance. Such information can help educators monitor the student's performance, infer current states of strength and weakness relative to design thinking variables, and provide targeted feedback to improve the student's performance. Our goal as educators should not focus on preparing our students to perform well on standardized exams, but to equip them with powerful skill sets that can help them succeed both within and outside of school.

This article presented relevant research that has provided the basis for understanding (a) the nature of design thinking, (b) experts' behavior in design, and (c) differences between novice and expert designers. Most of these studies were qualitative and employed protocol analysis, which has some limitations as a research method, especially for investigating design activities. For example, it can be a weak method when researchers aim to capture designers' nonverbal thought processes, which are critical in design thinking. The majority of the studies we reviewed aimed to examine either the differences between novice and expert designers or characterize expert behavior in the designing process. However, experimental evidence is lacking in the field of design research.

Researchers who are interested in measuring and supporting design thinking have great opportunities to conduct a wide range of experimental studies that can lead to important findings. For instance, researchers may examine the effects of the design thinking process on various learning outcomes. They can also investigate the effects of different tasks and their complexity relative to enhancing design thinking skills, which in turn are assumed to increase students' learning outcomes. It would also be interesting to know if design thinking skills mediate the learning process. In other words, design thinking skill may serve as a mediator that clarifies the nature of the relationship between an independent variable (e.g., problem-solving skill) and a dependent variable (e.g., math test scores). So, rather than hypothesizing a direct causal relationship between problem-solving skill and math test scores, we may hypothesize that problem-solving skill enhances design thinking skill, which in turn leads to an increase in math scores. Another important study could examine the domain-specific versus domain-independent nature of design thinking. In other words, can design thinking skill be examined independently of particular domains (e.g., engineering vs. marketing), or is it context bound?

Currently, we have found no valid performance-based assessments of design thinking skills. This lack adversely affects the ability to collect good evidence about the effects of these skills on learning (Rotherham & Willingham, 2009). A major challenge, then, is to design and develop accurate, performance-based measures of these skills. Assessing these types of 21st-century competencies is beyond the capabilities of most traditional assessment formats (e.g., multiple-choice test, self-report survey). Therefore, innovative assessments that aim to reliably measure those skills should be designed and developed to assist researchers in collecting valid and reliable evidence. We suggest employing the evidence centered design

(ECD) framework (Mislevy, Steinberg, & Almond, 2003) for designing valid performance-based assessments for 21st-century skills. ECD is a systematic approach to the design of assessments that focuses on the evidence (i.e., student performance and products) of proficiencies as the basis for constructing assessment tasks and making inferences about competency levels (for more, see Mislevy et al., 2003). ECD is especially suited for assessments that involve complex problems and dynamic, interactive environments—which are exactly the kinds of contexts required for design problems.

There is considerable empirical work to be done to establish a full understanding of design thinking. The studies surveyed in this article show the characteristics of novice and expert designers. Having good design thinking skills can assist in solving really complex problems as well as adjusting to unexpected changes. Although the design process involves in-depth cognitive processes—which may help our students build their critical thinking skills (e.g., reasoning and analysis)—it also involves personality and dispositional traits such as persistence and creativity. If we are serious about preparing students to succeed in the world, we should not require that they memorize facts and repeat them on demand; rather, we should provide them with opportunities to interact with content, think critically about it, and use it to create new information. Preparation for future work situations requires teaching learners to use their minds well. To turn the tide in education that is leaving students "ill-prepared to tackle real-world, complex problems [we must change our course] . . . we cannot directly adjust the wind (the future), but we can adjust

References

Ahmed, S., Wallace, K. M., & Blessing, L. T. M. (2003). Understanding the differences between how novice and experienced designers approach design tasks. *Research in Engineering Design, 14*, 1–11.

Akin, Ö., & Akin, C. (1996). Frames of reference in architectural design: Analyzing the hyper-acclamation (aha!). *Design Studies, 17*, 341–361. doi:10.1016/S0142-694X(96)00024-5

Atman, C. J., Chimka, J. R., Bursic, K. M., & Nachtmann, H. L. (1999). A comparison of freshman and senior engineering design processes. *Design Studies, 20*, 131–152. doi:10.1016/S0142-694X(98)00031-3

Badke-Schaub, P. (1999). Analysis of design projects. *Design Studies, 20*, 465–480. doi:10.1016/S0142-694X(99)00017-4

Ball, L. J., Evans, J., & Dennis, I. (1994). Cognitive processes in engineering design: A longitudinal study. *Ergonomics, 37*, 1753–1786. doi:10.1080/00140139408964950

Braha, D., & Maimon, O. (1997). The design process: Properties, paradigms, and structure. *IEEE Transactions on Systems, Man, and Cybernetics-Part A: Systems and Humans, 27*, 146–166. doi:10.1109/3468.554679

Braha, D., & Reich, Y. (2003). Topological structures for modeling engineering design processes. *Research in Engineering Design, 14*, 185–199. doi:10.1007/s00163-003-0035-3

Bright, A. (1994). Teaching and learning in the engineering clinic program at Harvey Mudd College. *Journal of Engineering Education, 83*, 113–116.

Bruner, J. S. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.

Christiaans, H., & Dorst, C. (1992). Cognitive models in industrial design engineering: A protocol study. In D. Taylor & D. Stauer (Eds), *Design theory and methodology—DTM92*. New York, NY: American Society of Mechanical Engineers.

Cross, N. (2004). Expertise in design: An overview. *Design Studies, 25*, 427–441. doi:10.1016/j.destud.2004.06.002

Cross, N., & Cross, A. (1998). Expertise in engineering design. *Research in Engineering Design, 10*, 141–149. doi:10.1007/BF01607156

Do, E. Y-L., & Gross, M. D. (2001). Thinking with diagrams in architectural design. *Artificial Intelligence Review, 15*, 135–149. doi:10.1023/A:1006661524497

Dorner, D. (1999). Approaching design thinking research. *Design Studies, 20*, 407–415. doi:10.1016/S0142-694X(99)00023-X

Dorst, K., & Cross, N. (2001). Creativity in the design process: Co-evolution of problem-solution. *Design Studies, 22*, 425–437. doi:10.1016/S0142-694X(01)00009-6

Dunne, D., & Martin. R. (2006). Design thinking and how it will change management education: An interview and discussion. *Academy of Management Learning & Education, 5*, 512–523. doi:10.5465/AMLE.2006.23473212

Dutson, A. J., Todd, R. H., Magleby, S. P., & Sorensen, C. D. (1997). A review of literature on teaching design through project-oriented capstone courses. *Journal of Engineering Education, 76*, 17–28.

Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., & Leifer, L. J. (2005). Engineering design thinking, teaching, and learning. *Journal of Engineering Education, 94*, 103–120.

Eisentraut, R. (1999). Styles of problem solving and their influence on the design process. *Design Studies, 20*, 431–437. doi:10.1016/S0142-694X(99)00016-2

Ericsson, K. A., Krampe, R., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100*, 363–406. doi:10.1037/0033-295X.100.3.363

Ericsson, K. A., & Smith, J. (Eds.). (1991). *Toward a general theory of expertise: Prospects and limits*. Cambridge, UK: Cambridge University Press.

Evans, D. L., McNeill, B. W., & Beakley, G. C. (1990). Design in engineering education: Past views of future directions. *Journal of Engineering Education, 79*, 517–522.

Fricke, G. (1999). Successful approaches in dealing with differently precise design problems. *Design Studies, 20*, 417–429. doi:10.1016/S0142-694X(99)00018-6

Gee, J. P. (2005). What would a state of the art instructional video game look like? *Innovate, 1*(6). Retrieved from http://www.innovateonline.info/index.php?view=article&id=80.

Göker, M. H. (1997). The effects of experience during design problem solving. *Design Studies, 18*, 405–426. doi:10.1016/S0142-694X(97)00009-4

Goldschmidt, G., & Weil, M. (1998). Contents and structure in design reasoning. *Design Issues, 14*, 85–100. doi:10.2307/1511899

Guindon, R. (1990). Knowledge exploited by experts during software system design. *International Journal of Man-Machine Studies, 33*, 279–304. doi:10.1016/S0020-7373(05)80120-8

Gunther, J., & Ehrlenspiel, K. (1999). Comparing designers from practice and designers with systematic design education. *Design Studies, 20*, 439–451. doi:10.1016/S0142-694X(99)00019-8

Hatchuel, A., & Weil, B. (2009). C-K design theory: An advanced formulation. *Research Engineering Design, 19*, 181–192. doi:10.1007/s00163-008-0043-4

Ho, C-H. (2001). Some phenomena of problem decomposition strategy for design thinking: Differences between novices and experts. *Design Studies, 22*, 27–45. doi:10.1016/S0142-694X(99)00030-7

Kavakli, M., & Gero, J. (2002). The structure of concurrent cognitive actions: A case study on novice and expert designers. *Design Studies, 23*, 25–40. doi:10.1016/S0142-694X(01)00021-7

Kolodner, J., & Wills, L. (1996). Power of observation in creative design. *Design Studies, 17*, 385–416. doi:10.1016/S0142-694X(96)00021-X

Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge, MA: University of Cambridge Press.

Liu, Y-T. (1996). Is designing one search or two? A model of design thinking involving symbolism and connectionism. *Design Studies, 17*, 435–449. doi:10.1016/S0142-694X(96)00018-X

Lloyd, P., & Scott, P. (1994). Discovering the design problem. *Design Studies, 15*, 125–140. doi:10.1016/0142-694X(94)90020-5

Lloyd, P., & Scott, P. (1995). Difference in similarity: Interpreting the architectural design process. *Planning and Design, 22*, 383–406. doi:10.1068/b220383

McNeill, T., Gero, J., & Warren, J. (1998). Understanding conceptual electronic design using protocol analysis. *Research in Engineering Design, 10*, 129–140. doi:10.1007/BF01607155

Mislevy, R. J., Steinberg, L. S., & Almond, R. G. (2003). On the structure of educational assessments. *Measurement: Interdisciplinary Research and Perspectives, 1*, 3–62. doi:10.1207/S15366359MEA0101_02

Nagai, Y., & Noguchi, H. (2003). An experimental study on the design thinking process started from difficult keywords: Modeling the thinking process of creative design. *Journal of Engineering Design, 14*, 429–437. doi:10.1080/0954482031000160691l

Nigel, C. (2004). Expertise in design: An overview. *Design Studies, 25*, 427–441. doi:10.1016/j.destud.2004.06.002

Owen, C. (2007). Design thinking: Notes on its nature and use. *Design Research Quarterly, 2*, 16–27.

Piaget, J. (1972). *The psychology of the child*. New York, NY: Basic Books.

Purcell, T., & Gero, J. (1996). Design and other types of fixation. *Design Studies, 17*, 363–383. doi:10.1016/S0142-694X(96)00023-3

Rotherham, A. J., & Willingham, D. (2009). To work, the 21st century skills movement will require keen attention to curriculum, teacher quality, and assessment. *Educational Leadership, 9*, 15–20.

Rowe, P. (1987). *Design thinking*. Cambridge, MA: MIT Press.

Seitamaa-Hakkarainen, P., & Hakkarainen, K. (2001). Composition and construction in experts' and novices' weaving design. *Design Studies, 22*, 47–66. doi:10.1016/S0142-694X(99)00038-1

Shute, V. J., & Becker, B. J. (2010). *Innovative assessment for the 21st century*. New York, NY: Springer-Verlag.

Shute, V. J., & Torres, R. (2012). Where streams converge: Using evidence-centered design to assess Quest to Learn. In M. Mayrath, J. Clarke-Midura, & D. H. Robinson (Eds.), *Technology-based assessments for 21st century skills: Theoretical and practical implications from modern research* (pp. 91–124). Charlotte, NC: Information Age Publishing.

Simon, H. A. (1996). *The sciences of the artificial* (3rd ed.). Cambridge, MA: MIT Press.

Stempfle, J., & Badke-Schaube, P. (2002). Thinking in design teams—an analysis of team communication. *Design Studies, 23*, 473–496. doi:10.1016/S0142-694X(02)00004-2

Suwa, M., Gero, J., & Purcell, T. (2000). Unexpected discoveries and s-invention of design requirements: Important vehicles for a design process. *Design Studies, 21*, 539–567. doi:10.1016/S0142-694X(99)00034-4

Tang, H-H., & Gero, J. S. (2001). Sketches as affordances of meanings in the design process. In J. S. Gero, B. Tversky, & T. Purcell (Eds.), *Visual and spatial reasoning in design II* (pp. 271–282). Sydeny: University of Sydney, Australia: Key Center of Design Computing and Cognition.

Todd, R., & Magleby, S. (2004). Evaluation and rewards for faculty involved in engineering design education. *International Journal of Engineering, 20*, 333–340.

Ullman, D., Dietterich, T., & Stauffer, L. (1988). A model of the mechanical design process based on empirical data. *Artificial Intelligence in Engineering Design and Manufacturing, 2*, 33–52.

Weth, R., Von der. (1999). Design instinct? The development of individual strategies. *Design Studies, 20*, 453–463. doi:10.1016/S0142-694X(99)00021-6

Authors

RIM RAZZOUK completed her PhD in instructional systems at the Florida State University (FSU), Tallahassee, Florida. She also pursued her master's in instructional systems and obtained a certificate in human performance technology from FSU. Her research interests focus on the application and evaluation of different learner-centered methods and strategies, integration of mobile technology in education, and development of team-shared mental models. Currently, Rim is working as the director of measurement and assessment at Edvation in Seattle, WA; e-mail: *rr05e@fsu.edu*.

VALERIE SHUTE is a professor at Florida State University. Before coming to FSU in 2007, she was a principal research scientist at Educational Testing Service (2001-2007) where she was involved with basic and applied research projects related to assessment, cognitive diagnosis, and learning from advanced instructional systems. Her general research interests hover around the design, development, and evaluation of advanced systems to support learning, particularly related to twenty-first-century competencies. Her current research involves using immersive games with stealth assessment to support learning of cognitive and noncognitive knowledge and skills.

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The Importance of Design Thinking

Aaron Shapland (http://www.business2community.com/author/aaron-shapland) – August 2, 2017

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Are you picturing a set of blueprints for a new, hyper-modern skyscraper? A colourful magazine cover? An artist scribbling away at a drafting table?

These are all ways we could use the word design, but "design thinking" is a concept that's much bigger. A design doesn't have to be a job title or a finished product. It doesn't even have to be art. At least, not in the traditional sense.

So, What Is Design Thinking?

How do you create something completely new? Something that's better, more efficient, or more beautiful than ever before? This requires a way of

- Focuses on the needs of the end user
- Encourages new perspectives and examines every angle
- Says that mistakes aren't just okay, they're part of the design process
- Believes that the end product can always be improved

Design thinking is a process that has several distinct, but repeatable steps.

Step 1: Empathy

How do you create something entirely new that focuses on the end user? First, you observe them. Who are they? What makes them tick? What are their goals, desires or fears? To truly understand a target market, you have to focus on the emotions. Fully understanding the emotional context of a user is a vital prerequisite for smart design.

Step 2: Define

After observing and interacting with people, design thinkers can't help but begin to understand their problems. What's missing from their lives? What would make things easier? Why doesn't the solution already exist?

Design thinkers focus on the simplest form of a problem. At Vordik, for example, we know that building a website isn't simply about putting together a folder of website files. We dig deeper by getting to know the *client* and the *end user* (which are rarely the same person). What is the purpose of the website?

Step 3: Ideate

Once design thinkers know *why*, the next step is *how*. Unfortunately, many non-design thinking companies will often skate through this part. They'll find one idea, concept or visual identity that seems to work and will simply go with it. But is it the best idea from a long-term or an end-user perspective?

When one only considers the first idea (or the second), one misses out on the chance to create something truly unique and revolutionary. The first ideas of even the most creative people are often simply regurgitations of existing ideas. Instead, design thinkers like to throw lots of ideas around and see what sticks. We collaborate and develop our ideas together.

Step 4: Prototype

Once we're pretty sure we have the best idea, we create a prototype. If we were in the business of designing running shoes, we'd produce a physical version of the finished shoe. Since we're a strategy, design, and development firm – and not footwear designers – we might create a prototype version of a website or a sample blog post.

Step 5: Invest and Test

Once design thinkers are confident about the prototype, it's time to invest the real deal. Running shoes roll out to the market and websites go live.

But design thinking isn't done yet.

Remember Step 1? We go right back to the end users to find out how they're using the product and how they feel about it. Did we solve the problem? Did we solve it in the best way possible? Chances are, there will always be room for improvement and design thinking allows us to continuously grow and learn how to do that.

The Purpose of Design Thinking

So why design thinking? What makes this process better than others?

When you've been in business for a while, it's easy to hit the auto-pilot button and roll out "new" products that are more like their predecessors than we might care to admit. It's easy to experience a success and think, "That's good enough. What's next?" It's easy to believe our apparent limitations and simply live within them. But this is not where creativity and innovation live. They live in design thinking.

consistently create completely unique, well-thought out products that have been distilled to their very best design, then design thinking

o.

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$100,000 (735)
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Business and Social Sciences

LINC 77 DESIGN THINKING OVERVIEW

Edit Course Outline

LINC 77 **DESIGN THINKING OVERVIEW** **Summer 2018**

2 hours lecture. **2 Units**

Total Contact Hours: 24 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 2 **Lab Hours:** **Weekly Out of Class Hours:** 4

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/17/17

Division Dean Information -

Seat Count: 25 **Load Factor:** .044 **FOAP Code:** 114000143072086000

Cross Listed as:

Related ID: LINC 77A, 77B, 77C, 77D

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course provides specialized training for strategic partners in college vocational programs, high schools, economic development initiatives, ROP, and capacity development projects for stakeholders in grades K-12. The primary target audience includes educators and students from school districts within the FHDA district service area: Mountain View-Whisman, Palo Alto Unified, Sunnyvale Elementary, Mountain View-Los Altos Union HSD, Los Altos Elementary, Fremont Union HSD, and Cupertino Union. The secondary target audience includes schools and residents throughout San Mateo, Santa Clara, Santa Cruz, and Alameda counties.

1. Description -

Students learn an overview of the design thinking methodology and its applications in education, business, industry and government. Focus is on introducing all aspects of the design cycle through inquiry-based facilitation and engaging immersive activities to develop understanding of the design thinking process.

Prerequisite: None

Co-requisite: None

Advisory: Experience with internet software tools, browsers, hyperlinks, online media resources, and basic skills using a computer.

2. Course Objectives -

The student will be able to:

A. Define and explain the design thinking process
B. Analyze the design thinking process for its best case uses in education, business, industry and government
C. Research the opportunities available to implement design thinking process
D. Communicate the benefits and drawbacks of the design thinking process
E. Apply the design thinking process
F. Develop strategies for effective design thinking activities, based on audience
G. Create case uses for education, business, industry and/or government audiences

3. Special Facilities and/or Equipment -

A. When offered on/off campus: Lecture room equipped with LCD projector, whiteboard, and a demonstration computer connected online. Computer laboratories equipped with online PCs and/or Macintosh computers, network server access, and printers.
B. When taught via the Internet: Students must have current email accounts and/or ongoing access to computers with email software, web browsing capability, and access to the World Wide Web.

4. Course Content (Body of knowledge) -

A. Design Thinking Process Definition and Explanation
    1. Empathize, define the problem, ideate, prototype, test
    2. Stanford d.school and IDEO connections
B. Design Thinking Process and Its Best Case Uses
    1. In education
    2. In business
    3. In industry
    4. In government
C. Opportunities Available to Implement Design Thinking Process
    1. Locally/contextually
    2. Community-based
    3. World-based
D. Benefits and Drawbacks of the Design Thinking Process
    1. Benefits
    2. Drawbacks
E. Design Thinking Process Applications
    1. In education
    2. In business
    3. In industry
    4. In government
F. Strategies for Effective Design Thinking Activities
    1. Partnering/small group

2. Building community
3. Contextual and empathetic facilitation of activities

G. Create Case Uses for Education, Business, Industry and/or Government Audiences
1. Use case #1 creation for education, business, industry and/or government
2. Use case #2 creation for education, business, industry and/or government

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

The student will demonstrate proficiency by:

A. Developing a project utilizing design thinking for the participant's specific purposes, whether educational, business-related or personal.
B. Presentation of their web-based project to peers.
C. Making constructive contributions to class discussions.

7. Representative Text(s) -

Martinez, Sylvia Libow, and Gary S. Stager. Invent to Learn: Making, Tinkering, and Engineering in the Classroom. Constructing Modern Knowledge, 2016.
Instructor-assigned notes and materials.

When course is taught online: Additional information, notes, handouts, syllabus, assignments, tests, and other relevant course material will be delivered by email and on the World Wide Web, and discussion may be handled with internet communication tools.

8. Disciplines -

Instructional Design/Technology

9. Method of Instruction -

During periods of instruction the student will be:

A. Listening actively to lecture presentations delivered in student-centered learning style by taking notes, following demonstrations, or completing an activity
B. Participating in facilitated discussions of live presentations, readings or video presentations
C. Presenting in small group and whole class situations

10. Lab Content -

Not applicable.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Each week requires the student to read and analyze selected websites or student projects related to that week's topic.
B. Each week's topic requires a written response to a prompt that is turned in to the instructor for review. Each prompt is designed to be a draft of a section of the student's completed project. Instructor feedback should be reflected in the final product.
C. Each week's topic requires the student to participate in a weekly discussion prompt based on that week's readings and assignment. Students are to respond to other students' responses offering support, suggestions, alternative ideas, and resources.

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

FOOTHILL COLLEGE
Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: LINC 84A

Course Title: 3-D Design Concepts

Catalog Description:

Intended for educators, trainers, and others, this course will provide the basics to move designs from concepts to finished learning projects. Throughout the course, there will be a focus on application of finished products to meet a specific need or learning outcome. Within the course, troubleshooting and basic maintenance concepts will be covered to allow educators to operate and manage 3-D printers.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

X The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Makerspace Specialist

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  This certificate is still in development and is anticipated to be submitted in May 2018.

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

Offers academic and vocational instruction to those interested in working in education, government, business, and/or industry. 3-dimensional design technology improves the design process that, in turn, benefits businesses, education settings, government, and other industries.

NOTE: *Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).*

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Attachments:
- Job advertisements: Indeed.com – 3D Design; 864 available
- Article: Making It Real: A cooperative, multigrade, 3D design project by Shealer; *Technology & Engineering Teacher*
- Report: New 3D Printers Aid STEM & Design Teaching: *Education Journal*

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

ld The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

_____ This is a non-degree applicable credit course (specify which one, below)

_____ non-degree applicable basic skills course

_____ course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)

_____ pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

ld This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

ld The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Lisa DeLapo **Date:** 10/25/17

Division Curriculum Representative: Bill Ziegenhorn **Date:** 12/1/17

Date of Approval by Division Curriculum Committee: 12/1/17

College Curriculum Co-Chairperson: _____ **Date:** _____

indeed

what: 3d design (job title, keywords or company)

where: Los Altos, CA (city, state, or zip)

Find Jobs

Advanced Job

3d design jobs in Los Altos, CA

Jobs 1 to 10 of 864

Upload your resume - Let employers find you

Be th
Los A
My email:
Also g
just for me
Activate

My recent searches

design thinking - Los Altos, CA - 42 new

» clear searches

Show: **all jobs** - 10 new jobs

Sort by: **relevance** - date

Distance:

within 25 miles

Salary Estimate

$70,000 (647)
$80,000 (560)
$90,000 (450)
$100,000 (297)
$110,000 (166)

Job Type

Full-time (816)
Internship (39)
Temporary (24)
Contract (23)
Part-time (11)
Commission (1)

Location

San Jose, CA (142)
Sunnyvale, CA (123)
Santa Clara, CA (80)

Entry Level Creative Inventor

LTA Research - Mountain View, CA 94043

Experience in design and fabrication of assembly jigs, fixtures and tooling for large structures. You will work within a dynamic engineering and design team to...

Easily apply

Sponsored - save job

Architectural Designer

McMahon Architects and Builders Inc. - San Francisco, CA 94114

Revit and 3D software, graphic design skills would be exceptional. Design and Drafting:. Builders, residential homeowners, and commercial developers truly...

Easily apply

Sponsored - save job

Senior Product Design Engineer

A2Z Development Center, Inc. - Sunnyvale, CA

Proficiency with Design for Cost and Design for Manufacture for consumer products. Experience with 3D CAD skills, ProEngineer....

Sponsored by **Amazon.com** - save job

UI Designer

Toyota Research Institute - Los Altos, CA

Experience with 3D design software (e.g. Experience creating designs in VR. Experience working within a user-centered design process....

30+ days ago - save job - more...

making it real:

A COOPERATIVE, MULTIGRADE, 3D DESIGN PROJECT

BY
RON AND
MICHELLE
SHEALER

I witnessed a transformation as the older students took on the role of teacher or mentor, working diligently with their junior counterparts.

It had been well over 20 years since I spent any amount of time working with students in a primary school setting. Despite that, for this project, I found myself, along with my group of eighth grade Tech Ed students, standing amid a classroom of first-grade students. The eighth graders were quick to point out the miniature desks and chairs they would soon fill—or should I say overfill. Smiles aside, it was still obvious that both groups were nervous about meeting and working with their new friends. I witnessed a transformation as the older students took on the role of teacher or mentor, working diligently with their junior counterparts.

Three weeks prior, both classes were introduced to a new cooperative project, an idea that culminated while my wife, a first grade teacher, and I, a middle school Tech Ed teacher, talked about our upcoming lessons. The first graders were getting ready to begin their unit entitled "Going Green in the Neighborhood." My eighth grade Tech Ed class had just received two MakerBot 3D printers, a welcome addition to our program.

Always willing to try something new in the classroom, we started tossing around some ideas and questions. What if the first-grade students sketched home designs on paper to make a model community? Could the eighth-grade students take those drawings and make them into 3D computer models and print them out as true 3D models in plastic? The "Going Green" theme sounded like a unique opportunity to utilize STEM skills at both levels. How well would the two different age groups work together? What sort of grouping made the most sense? With several miles between the schools, how could we get the groups together? It wasn't long before I sent off an email to my principal, Dr. Karen Wiser, sharing the idea and asking if transportation might be available. She had recently allocated the funds necessary to purchase the 3D printers. With that in mind, I had a good feeling we would get two thumbs up to proceed with planning.

As the first-grade class started a few short lessons on sketching and home design, the eighth graders were finishing up learning the basics of the free drawing program, Google SketchUp. We decided to pair two first graders and two eighth graders together, forming a group of four. Each group had to sketch, design, and print a home for a model family that would then become a component of their ideal community. My wife smiled and announced, "Remember, these are first graders" as she presented me with a stack of sketches from her class. My reply, "This is going to be a very interesting project!"

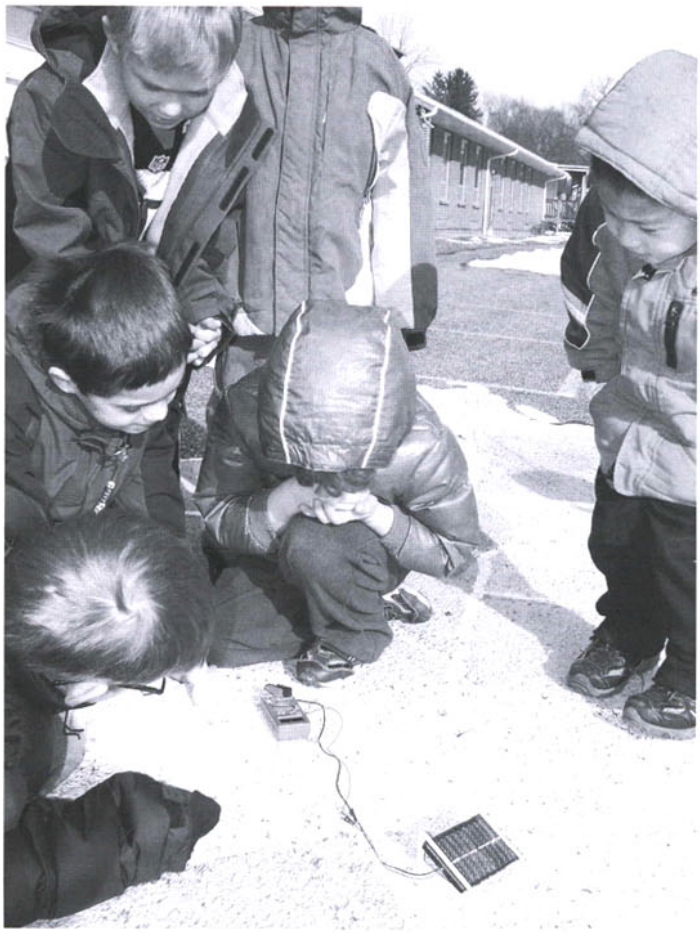
Each of the eighth-grade student groups received a sketch from a first-grade counterpart. I asked them to evaluate the sketches and record any questions that arose. After developing the lists of questions, we did some brainstorming on how best to communicate over distance with our partners for clarity in the designs. Email and phone calls were ruled out, and traveling just to ask a few questions wasn't feasible. It wasn't long before the idea of Skype was mentioned.

First graders proudly show off Cougarland.

The next class period found the groups huddled around laptop computers, sharing the drawings through the computer camera and asking questions of their partners. I recall one of the eighth graders whispering to me, "They are really small!" I heard questions like, "Do you really want that many doors?" and "Is that an arched window?" "Is this a hot tub?" and a question regarding a very unique feature on a home, "Um, what is this large pole coming out of the roof?" A shocking reply from the first graders, "Oh, that's a lightning attractor to power our house." Creativity and imagination were definitely not lacking. The eighth graders were impressed.

After the Skype session, my class was given three class periods to develop a 3D drawing. We discussed scale and proportion, reviewing a math topic from seventh grade. I had some concerns that my students might not put forth their best effort, risking the disappointment of their younger partners. These thoughts quickly dissipated. The Skype session had given them faces to go with the names, and I witnessed my students taking extra steps to make their projects special; they were no longer just answering to their teacher. While drawing, we talked about different types of careers where they might use technology skills to fill the needs of a client. It was made clear that their elementary counterpart was taking on that role—they were the client.

The following week we loaded up on the bus, laptops in hand, Makerbot printer in tow, and headed off to meet our first-grade clients. Even though the groups had met electronically, there was still an air of uncharacteristic shyness in the classroom. The students started working together in whispers, but by the end of their hour-and-a-half block of time, we were asking them to quiet down. Their goal was to review the initial computer design, make any necessary changes and additions, and then begin the process of painting and selecting materials. They had to have a completed design by the end of the meeting. While they worked, I set up the MakerBot and began printing a model home. Each group came up to the printer, and the eighth graders explained how the machine operated and what it was doing. Ninety minutes proved to be more time than needed, so we had each group present their design to the class via the projector. After a quick snack together, goodbyes and hugs were shared, and the eighth graders boarded the bus again and headed back to the middle school.



First-grade students experiment with the solar panels that will power Cougarland.

Back in our middle school Tech Ed lab, we warmed up our two 3D printers and started printing out the fifteen plastic houses for the first graders. We wanted each student to get a model to keep. With the printers buzzing in the background, we started talking about other additions we could design for the "Going Green" model community. Our school building has two full-size wind turbines on the roof, along with a large photovoltaic solar panel, all of which are wired into the Tech Ed lab. The eighth graders have been exposed to those technologies, so that was the main area of interest. How could we develop a working turbine that the first graders could experiment with and add to their project? Did something already exist, or would we need to start from scratch? Where could we find some small photovoltaic panels?

The research and part-scrounging began. In our science department, we found a few small PV cells, but they needed a stand or base. It didn't take long to come up with a drawing on the computer to print a 3D stand in plastic. It would hold the cells in a realistic, angled fashion. After printing the necessary stands, we began wind-turbine work.

A nice three-blade turbine was found on the Thingiverse.com website. With a quick alteration of the hub, we were able to make it fit on an inexpensive electric motor. The turbine also needed a realistic and functional stand, as one could not be found. While we developed computer drawings for those parts, we began experimenting and testing. With a voltage ohm meter in hand, we discovered that the inexpensive DC motors generated a marginal amount of measurable electricity. With more digging, we found an upgraded DC motor we had used for solar car races the previous year. A package with fifteen houses, two PV panels, a wind turbine, battery, variety pack of LEDs, test leads with alligator clips, and a VOM were passed on to the elementary school. We knew they would be discussing recycling and refuse handling, so we designed and printed out miniature trash cans and recycling bins to go with each house. Street signs were also thrown into the mix.

Needless to say, our young counterparts were thrilled with the package. They started first by examining their 3D homes and placing one from each group in their newly named community, "Cougarland." After a few demonstrations from the first-grade teacher, the students began experimenting with the wind turbine. First, they took turns spinning the turbine by hand to see who could get the largest reading on the VOM. They discovered that spinning in one direction would bring up a negative number, while the other direction did not—DC discovered. They hooked a battery to the motor and saw how the device now became a fan of sorts. Alternating the battery connections changed the fan direction. VOM readings were a bit on the abstract side for the

Eighth graders and first graders meet to refine final designs before printing.

younger learners. The LEDs were introduced, and students saw that they could spin the turbine and create light. "Cougarland" now had electricity!

The PV panels and VOM went outside with them at recess. They tested different angles and watched how shadows impacted the output. It wasn't long before they were asking if they could connect the LEDs to the PV panels—aha, another source of power for "Cougarland"!

As "Cougarland" evolved, it received numerous visits and tours from administrators, parents, teachers, and other students. The first-grade students were more than happy to show off their creation, demonstrate its features (especially the wind turbine), and share how it came to be. Several emails were received about the project including the following from the parent of a first-grade student: "[My son] was talking about the solar panel yesterday. Definitely made an impact, as he was discussing how much electricity it was creating based upon the meter readings. Appreciate you introducing these topics, maybe these students will move us toward more sustainable, diversified, and efficient energy policies in the future."

THE NEXT STEP

How will the project evolve for future offerings? After the project, both groups provided ideas and feedback for future designs. A small, key-chain-sized, solar-charged flashlight was recently discovered. It won't take much hacking to change that into a solar-charged home with LED lighting.

Another discussion of improvements brought up the idea of working street lights for the community. A third idea, still within the realm of middle-level abilities, would be to design a working model of a hydroelectric power plant. If none of that works, we could always go back to the idea the first graders had...lightning!

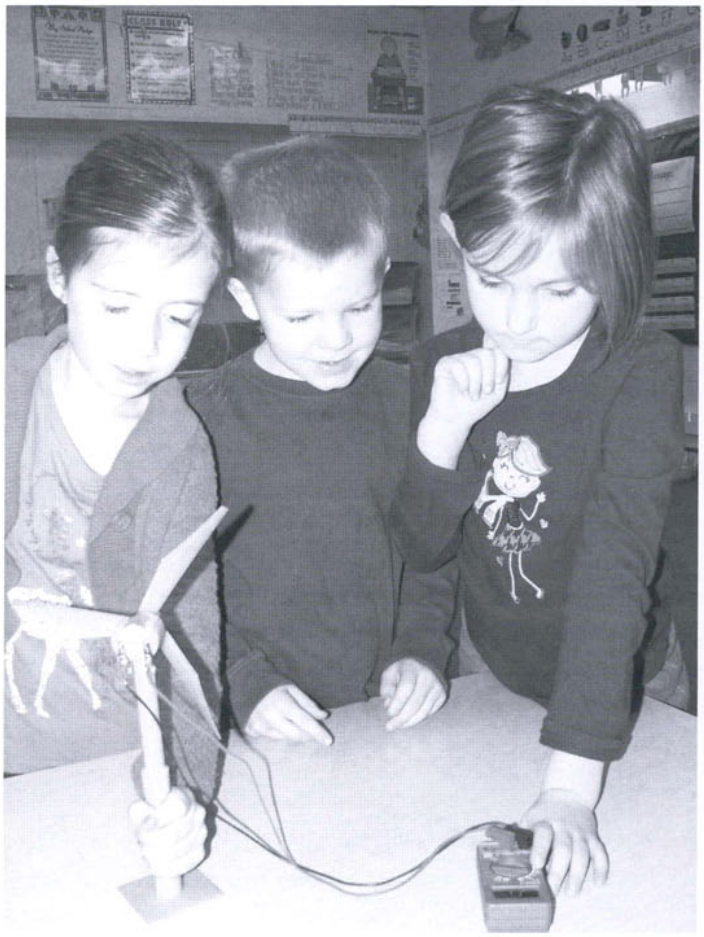
ACADEMIC STANDARDS

This project addressed a variety of Pennsylvania elementary and middle-level standards, particularly in the area of Science and Technology.

The content standards in ITEEA's *Standards for Technological Literacy* (ITEA/ITEEA, 2000, 2002, 2007) include:

STL3: The relationships among technologies and the connections between technology and other fields.

STL8: The attributes of design.



First graders testing the wind turbine.

STL10: The role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

STL16: Energy and Power Technologies.

Ron and Michelle Shealer *both teach in the State College Area School District, State College, PA. They can be reached at mls39@scasd.org.*

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New 3D printers aid STEM and design teaching

A 3D printer programme aimed at boosting science, technology, engineering, maths, and design and technology teaching is to be extended by Education Secretary Michael Gove. While 3D printing is already an established industrial technology, it is a new concept in schools and in 2012 the Department for Education funded a project to allow 21 secondaries to trial the use of the printers in STEM and design and technology classes.

A £500,000 fund will now be set up to enable 60 schools to buy 3D printers and train teachers to use them effectively. A report into the pilot revealed that so far in the UK, the technology had been restricted largely to design and technology classes but that there was considerable potential for them to be used within a range of STEM subjects. The pilot schools reported that early work with the printer had often been limited to demonstrations and printing of small files such as 3D shapes. This had highlighted the need for teachers to receive training. Examples of how the printers were used included:

- Science departments used the 3D printer as a context to discuss the properties of plastics, to build models for teaching science such as molecules, eyeballs, cells and sine waves, and to build components for working equipment such as rockets
- At Watford Grammar School for Boys the printer was used to demonstrate a 3D graph for various algebraic equations as well as producing examples of regular shapes (dodecahedron)
- Honywood Community Science School in Essex designed an advanced 3D development learning tool, enabling pupils to create 3D objects using typed code in POV-Ray3. This enabled pupils to practise writing and debugging code and also supported studying algebra and understanding 3D/2D space

Help change the face of community learning

Following the conclusion of a six month pilot of the eReading Rooms project, a scheme which involved a small group of UK online centres trialling a new approach to community elearning, the Tinder Foundation has been funded to find centres that wanted to be involved.

The eReading Rooms pilot engaged people in activities ranging from baking to jewellery making, composting to composing, word search to jobsearch, all of which were enabled or enhanced by technology. The project engaged with almost 1,500 learners from hard-to-reach groups, who were excluded by a range of factors including age, disability, education, lack of employment or language skills.

The project was funded by the Department for Business Innovation and Skills. The Tinder Foundation is inviting centres to tell them about content they have developed that they would be happy to share, which could be on any non-formal learning and, which was not necessarily limited to digital skills.

Thousands of pupils to visit First World War battlefields

More than 1,000 schools have already signed up to give their pupils the chance to visit the First World War battlefields under a centenary scheme set up by Education Secretary Michael Gove. Each participating school will send at least 2 pupils and a teacher on a 4-day tour to see some of the great battlefields and other notable sites, and to take part in remembrance ceremonies on the western front. The tours will start in spring 2014 and will run until 2019.

Submissions Course Outline Editor

Return to Administration

For authorized use only

View for Printing *(New Window)* ***Run Compare Utility*** *(New Window)*

Business and Social Sciences

LINC 84A 3-D DESIGN CONCEPTS

Edit Course Outline

LINC 84A **3-D DESIGN CONCEPTS** **Summer 2018**

2 hours lecture. **2 Units**

Total Contact Hours: 24 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 2 **Lab Hours:** **Weekly Out of Class Hours:** 4

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU **Validation:** 6/21/17

Division Dean Information -

Seat Count: 35 **Load Factor:** .044 **FOAP Code:** 114000151011086000

Cross Listed as:

Related ID: LINC 84B

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course provides specialized training for strategic partners in college vocational programs, high schools, economic development initiatives, ROP, and capacity development projects for stakeholders in grades K-12. The primary target audience includes educators and students from school districts within the FHDA district service area: Mountain View-Whisman, Palo Alto Unified, Sunnyvale Elementary, Mountain View-Los Altos Union HSD, Los Altos Elementary, Fremont Union HSD, and Cupertino Union. The secondary target audience includes schools and residents throughout San Mateo, Santa Clara, Santa Cruz, and Alameda counties.

1. Description -

Intended for educators and others, this course will provide the basics to move designs from concepts to finished learning projects. Throughout the course, there will be a focus on application of finished products to meet a specific need or learning outcome. Within the course, troubleshooting and basic maintenance concepts will be covered to allow educators to operate and manage 3-D printers in their schools.

Prerequisite: None

Co-requisite: None

Advisory: Experience with internet software tools, browsers, hyperlinks, online media resources, and basic skills using a computer.

2. Course Objectives -

The student will be able to:

A. Define and identify the types of 3-D design and their uses.
B. Identify how 3-D design can be used to replicate, improve and reduce the costs of producing items.
C. Identify and employ the parts of the design process from 2-D image to 3-D solid.
D. Design and produce basic items quickly and easily.
E. Prototype and test items to develop iterative designs.
F. Identify potential uses for independent 3-D design in education, business, and/or government audiences.

3. Special Facilities and/or Equipment -

A. When offered on/off campus: Lecture room equipped with LCD projector, whiteboard, and a demonstration computer connected online. Computer laboratories equipped with online PCs and/or Macintosh computers, network server access, and printers.
B. When taught via the Internet: Students must have current email accounts and/or ongoing access to computers with email software, web browsing capability, and access to the World Wide Web.

4. Course Content (Body of knowledge) -

A. Introduction to 3-D Design Possibilities and Uses
    1. Reinventing existing objects
    2. Combination of design and artistic genres
    3. Prototyping new products
    4. Additive/ancillary items to existing items
B. Design Techniques in 3-D Printing
    1. Creating 2-D sketches to visualize items
    2. Using online databases as models to improve designs
    3. Reverse engineering models to understand design and process
    4. Combining design processes from multiple models
C. Using 3-D Design Software
    1. Developing basic shapes (cube, cylinder, sphere, cone)
    2. Combining multiple shapes within one project
    3. Understanding scale and its applications within the specific software application
    4. Understanding the types of 3-D design software, their features and uses within industry, business, education and other applications
D. 3-D Production Process
    1. Creating solid objects
    2. Creating hollow objects
    3. Duplicating objects to ensure scale and interoperability
    4. Slicing objects to ensure interoperability
E. Design Guidelines for Successful 3-D Printing

1. Material types and uses
2. Build orientation
3. Object thickness considerations (strength/weight)
4. Designing connected parts and custom features/designs)

F. Potential Applications for 3-D Design within Society
1. Educational applications
2. Business applications
3. Government applications
4. How does 3-D design reduce costs and time in the product production cycle

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

The student will demonstrate proficiency by:

A. Developing a project utilizing 3-D design software for the participant's specific purposes, whether educational, business-related or personal.
B. Presentation of their web-based/3-D printed project to peers.
C. Making constructive contributions to class discussions.

7. Representative Text(s) -

Instructor-assigned notes and materials.
Example textbook: Micallef, Joe. Beginning Design for 3-D Printing. Apress Media, 2015. Print.

When course is taught online: Additional information, notes, handouts, syllabus, assignments, tests, and other relevant course material will be delivered by email and on the World Wide Web, and discussion may be handled with internet communication tools.

8. Disciplines -

Instructional Design/Technology

9. Method of Instruction -

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10. Lab Content -

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11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Each week requires the student to read and analyze selected websites or student projects related to that week's topic.
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FOOTHILL COLLEGE
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Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: LINC 84B

Course Title: 3-D Design & Fabrication

Catalog Description:

Intended for educators and others, this course will provide the fundamentals of 3D design and fabrication concepts. The use of basic design software and online libraries will be used to assist in developing and designing 3D projects for learning projects by students in grades K-12, business, industry, and/or government. An emphasis will be placed on design concepts to meet a specific educational/instructional/project need.

Are you requesting Stand Alone Approval for the course on a <u>temporary</u> or <u>permanent</u> basis?

_____ The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

X The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Makerspace Specialist

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

  This certificate is in development with an anticipated submission date of May 2018.

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. <u>Primary</u>: offer academic and vocational instruction at the lower division level; and
2. <u>Primary</u>: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. <u>Secondary</u>: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

Knowing design concepts and applying them to the fabrication process results in better prototypes and products. This course offers academic and vocational instruction to those interested in working in

education, government, business, and/or industry. 3-dimensional design technology and fabrication improve the processes that, in turn, benefits businesses, education settings, government, and other industries.

NOTE: *Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).*

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Attachments:

- Who's Afraid of Fabrication? Why teach digital fabrication now? By Brennan Buck in *Negotiating Design & Making*
- Indeed.com job search: 767 fabrication jobs available within 25 mile radius of Los Altos, CA
- "Digital Fabrication and 'Making' in Education: The Democratization of Invention" by Paulo Blikstein – Stanford

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

ld The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

_____ This is a non-degree applicable credit course (specify which one, below)

_____ non-degree applicable basic skills course

_____ course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)

_____ pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

ld This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

ld The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Lisa DeLapo **Date:** 10/25/17

Ensure you're using the current version of this form by downloading a fresh copy from the CCC webpage!

Division Curriculum Representative: Bill Ziegenhorn **Date:** 12/1/17

Date of Approval by Division Curriculum Committee: 12/1/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Fig. 1: Assembly One Pavilion. Reflected light at night.

WHO'S AFRAID OF FABRICATION? WHY TEACH DIGITAL FABRICATION NOW?

BRENNAN BUCK

Much of the intellect and capital invested in architectural education over the last ten years has gone into digital fabrication. Schools have acquired laser cutters, CNC mills, 3D printers, plasma cutters, water jets and robotic arms, and faculty and students have used them to produce experimental objects, surfaces, interiors and small structures. The arguments made by Bernard Cache, Greg Lynn and Mario Carpo that have inspired much of this work have become implicit for many instructors and some students. Always practice-driven, these ideas have seeped into the profession, enabling an expanding array of pavilion projects and fabrication competitions. In fact, CNC processes continue to revolutionise the building industry at all scales, but their potential in academia seems to have plateaued, isolated on the periphery as under-theorised electives and rarely playing a significant role in design studios.

There is always value for students in working with current technology at full scale with architectural materials, but is there still a relevant project to be found in teaching fabrication beyond the general benefits of craft? Is there a new argument to be made, following up on those about mass-customisation and consumer culture from Lynn or aesthetic notions of sameness and repetition from Carpo? Can or should fabrication play a more central role in design education?

The Assembly One pavilion, designed, fabricated and erected by Yale School of Architecture students in 2012, exposes some potential answers. The project evolved in the shadow of the Yale Building Project: a 40-year tradition in which first-year graduate students design and build a house using common residential construction techniques. But unlike the Building Project, which has always been defined through the lens of craft, the Assembly project was geared toward exploiting Yale's extensive CNC technology, and that focus on technology transformed not only the students' means of production, but redefined their approach to the project from the beginning. An alternate way of realising the project forced the students to rethink their roles as designers and ultimately uncovered an inversion of some basic assumptions about working digitally.

EXPLICIT, SEQUENTIAL PROCESS

Since nearly the initial introduction of digital techniques to architecture, they have been associated with Peter Eisenman's project of explicit process and indexical form. The autonomous programming languages that underlie software evoke Eisenman's vision of an intrinsic grammar for architecture's own internalised language. His strategic use of explicit, often sequential formal manipulations lent themselves to the distinct and numeric nature of digital transformations such as translation, rotation and scaling. As they proliferated, digital techniques have also been read repeatedly as a foreground process, indexicality, and the apparent 'difficulty' of design.[1] What the Assembly course revealed and made clear to the participating students, however, was the opposite – that the integral nature of the digital model absorbs individual design decisions and specific manipulations, rendering them indistinguishable. The integration of fabrication into the project forced the group of designers to work systematically rather than sequentially. In addition to larger scale factors like size and orientation on the site, a number of detail parameters were determined early on to suit the available fabrication technologies, including the use of sheet material, extruded geometry and applied colour. As a result, rather than moving down in scale from site to massing,

Fig. 2: Assembly One Pavilion on the New Haven Green during the International Festival of Arts & Ideas. (Photos: Chris Morgan Photography.)

Fig. 3: The structure is suited to a performance festival. Solid and massive from one angle, lightweight and almost entirely porous from another, it alternately hides and reveals its contents.

to structure, material and detail, responses had to be adapted to each constraint simultaneously and incorporated into a single design. The interdependence of each factor forced a process of trial-and-error integration and negotiation. The result was a completed project that cannot be easily read as indexical, i.e. as a record of a process or series of events.

But if the link between the architectural index and digital technique can indeed be broken, Eisenman's deeper interest in mediated authorship might still be preserved.

Explicit process gave Eisenman an alternative to architecture's humanist focus, dominant since the Renaissance, a way to challenge his own intuitive authorship. Alejandro Zaera-Polo, writing an introduction to Eisenman's work in *El Croquis* in 1997, describes this critical tactic: 'By replacing the origins, the presence and the author by arbitrariness, absence and machinic behaviour, he has found the recipe for a non-conservative resistance.'[2] Zaera-Polo cites the Arnoff Center in Cincinnati as the best example to date of this machinic process. Zaera-Polo's extensive description of each successive formal manipulation, sequential 'displacements', 're-orientations', 'asymptotic tilts' and 'exponential overlaps', is supplemented by a 'flow chart' placing each move in a rationalised, if still arbitrary sequence.[3]

Fig. 4: Constructed from thin aluminium sheets, the pavilion opens up on two sides for ventilation and security, focusing the view toward the festival's main stage. (Photo: Chris Morgan Photography.)

Fig. 5: From one particular point, the pavilion is entirely porous, nearly disappearing.

At the time, it appeared that emerging software would allow Eisenman to extend this trajectory, rendering each step in the sequence even more explicit and partitioned from the vagaries of intuition. A version of Zaera-Polo's flow chart can be seen in every published Grasshopper screenshot: a segmented and rationalised sequence of geometric and data translation. However, this sequence is an abstraction of the temporal process involved, one where input parameters, transformations and resulting geometry are constantly being adapted and relinked. As Patrik Schumacher maintains, the digital model can now easily become so information-rich that it becomes circular, looping back to incorporate ever more constraints simultaneously. In fact, the digital design model may open up an alternate model of mediated authorship, one that 'produces results far beyond the architect's "natural" range.'[4]

SYNTHETIC AND SIMULTANEOUS PROCESS

At a small scale, the Yale Assembly project cast the differences between a project developed in models and drawings and one developed for fabrication in stark contrast. Both Assembly One and the Yale Building Project entail an elaborate design, mobilisation and construction process that involves both collaboration and delegation. In the case of the Building Project, stick frame construction and some form of contextual deference are assumed, leaving the students to work out the massing and interior organisation first before developing strategies for windows and doors, materials and the landscape. Later, once a specific design is chosen, the class tackles the specifics of structure, detailing, furnishing and material sourcing. As they work, their models and drawings shift from small studies of masses on the site to larger iterations of rooms and details. The entire sequence is a cascade of development that generally moves from the large scale to the small, from the apparently important concerns of site and program to the less consequential questions of character and environment.

The group of 13 students designing the Assembly One pavilion was initially drawn to a similar sequence, diving into the site and potential massing shapes initially before realising that the potential of material, detail and structure were actually the central questions to consider. Their process jumped between considering the size and shape of the project on the Green, to the rigidity of multiple materials in different configurations, the visual and environmental effects of those forms and the limits of the project budget. Clearly, any design project rendered in any medium will incorporate at least this many decisions, but what became clear during assembly was a complete loss of scalar or temporal sequence. The massing of the project was reinvented countless times as the material, detailing or even the paint scheme changed.

This state of unstable interdependence was mandated by the digital model. This consisted of a two-dimensional structural pattern, a single point the pattern was extruded toward, and an inner and outer envelope used to trim away the extruded surfaces. Sketching or imagining any of the three in isolation was meaningless. What followed was a constant game of adaptation that took the students far from what they initially imagined.

DIGITAL DESIGN AUTHORSHIP

This synthetic structure affects the design process in several specific ways. First, the moment of inspiration is drawn out. Design conception no longer has the purity or immediacy of a momentary idea or quick sketch but emerges in unexpected ways over the course of the project. Second, the hierarchy of constraints is levelled. Fabrication projects privilege a different set of questions than building design projects that are developed through representation. Program and urban or site constraints are generally simplified in favour of material properties and perceptual effects, raising the elements of the

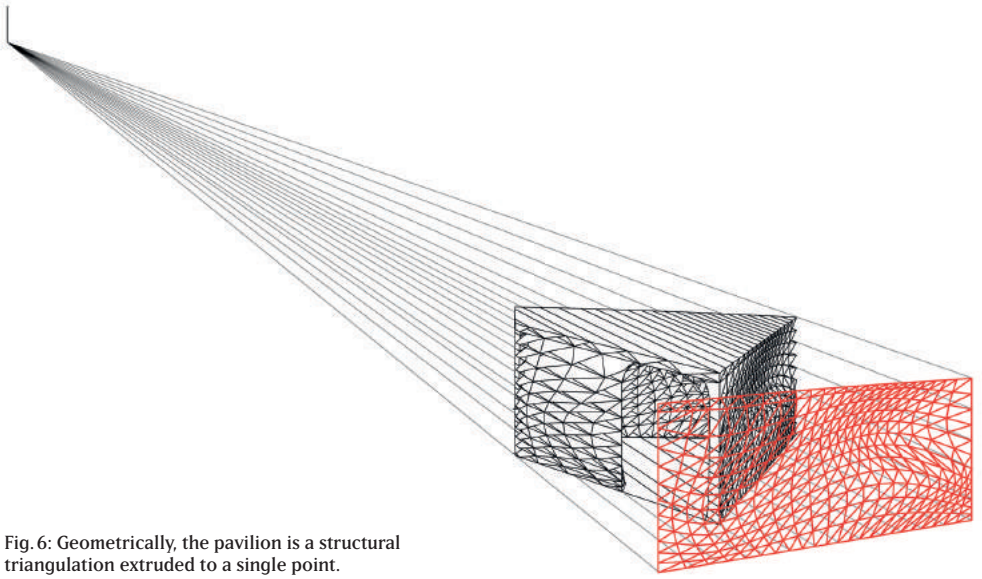

Fig. 6: Geometrically, the pavilion is a structural triangulation extruded to a single point.

Fig. 10: The aluminium was folded and riveted into corrugated layers.

Fig. 11: One 'brick' partially completed.

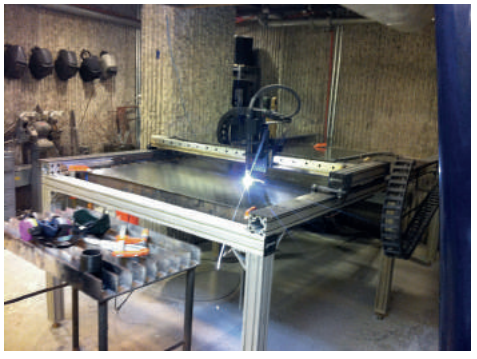

Fig. 7: 300 sheets of aluminum were cut and painted at the Yale fabrication lab.

Fig. 8: Cut and painted sheets.

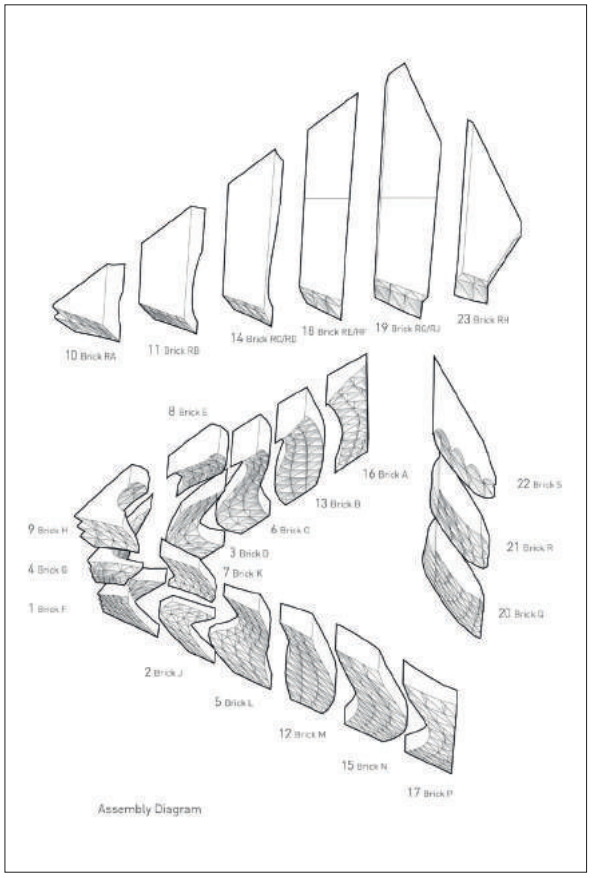

Fig. 9: Twenty-three 'bricks' were fabricated at the architecture school and assembled on site.

Fig. 12: Despite the large scale of the structure, the pavilion remained very lightweight.

physical environment to the same status as site and program. Allowing this alternate structure for design to invade the design studio might raise alternatives to the still-prevalent sequence that begins with site analysis and massing sketches and ends with choices about material, detail and finish.

Eisenman posed mediated authorship as a way to free himself from his own intuition, but he also hoped to escape the constraints of dominant modes of production. The arbitrariness of the design process allowed him to temporarily ignore and potentially reinvent the way his own buildings are built.

Fig. 13: View through the structure on the New Haven central green.

Assembly suggested the reverse: that the imposed structure of digital fabrication enables its own form of mediated authorship. An expanded set of production techniques allows architects and students to transform the way they design. Even without rendering the design process explicit, digital modes of design and production may help students transcend the assumptions and brackets they bring to their work and reframe the way they make architecture.

CREDITS

The Assembly One pavilion was designed and built by Yale School of Architecture students.

PROJECT FOUNDERS: David Bench, Zac Heaps, Jacqueline Ho, Eric Zahn
PROJECT MANAGERS: Jacqueline Ho, Amy Mielke
DESIGN & FABRICATION: John Taylor Bachman, Nicholas Hunt, Seema Kairam, John Lacy, Veer Nanavatty
DESIGN: Rob Bundy, Raven Hardison, Matt Hettler
FACULTY ADVISOR: Brennan Buck
ASSISTANT: Teoman Ayas
CONSULTANT: Matthew Clark of Arup, New York
Photos by Chris Morgan Photography

NOTES

1 Greg Lynn's early experiments with alias software tracked the iterative deformation of primitive solids; Lars Spruybroek's vivisection structures, including his H2O Pavilion, were defined by sequential ribs; Robert Somol has criticised digital technique for producing inaccessible, difficult architecture.

2 Alejandro Zaera–Polo, 'Eisenman's Machine of Infinite Resistance', *El Croquis*, 83 (1997), pp. 50–63.

3 Ibid.

4 Patrik Schumacher, *The Autopoiesis of Architecture, Volume II: A New Agenda for Architecture* (Chichester: Wiley, 2012), p. 338.

indeed

what: fabrication (job title, keywords or company)

where: Los Altos, CA (city, state, or zip)

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Digital Fabrication and 'Making' in Education: The Democratization of Invention

Paulo Blikstein (paulob@stanford.edu)

Assistant Professor, Graduate School of Education and (by courtesy) Computer Science Department

Stanford University

1. The Democratization of Invention

1.1 Digital Fabrication: Logo for Atoms

A quote often attributed to Seymour Papert states that if a teacher from the 16th century would time-travel to the present, he or she would have no problem entering a school and teaching a class. Historical documents from that time show that he could not be more accurate. The Treviso Arithmetic, from 1478, teaches students how to do multiplication and division using 'exactly' the same paper-based algorithms we use today. Several descriptions of 16th century schools and their curricula look strikingly similar to today's mathematics classes, such as a well-known school in Florence run by Master Francesco Ghaligai in 1519 which had a "…heavy emphasis on memorization and procedures" and a curriculum comprised of units on "multiplication, practice in the use of algorithms, division, fractions, and the rule of three" (Swetz & Smith, 1987).

A thriving 15th century Venice saw the appearance of the Treviso Arithmetic in a time of great need for a new type of mathematics. The Indo-Arabic system was proving itself to be faster and more practical than the abacus, and soon Venetians realized that it was also easier to learn. All the pieces were falling into place: a new set of societal needs, new technologies, new ways of using knowledge, and the recognition that a task previously monopolized by experts was potentially accessible to the masses ('restructurations,' Wilensky & Papert, 2010).

Every few decades or centuries, a new set of skills and intellectual activities become crucial for work, conviviality, and citizenship—often democratizing tasks and skills previously only accessible to experts. Fast forward to the early seventies: computer programming was becoming one of those new activities (Papert, 1991). But computers in those years were large, expensive, awkward machines, and the idea of using them as a medium for personal expression and learning was inconceivable—in the same way that the abacus establishment derided the Treviso techniques. The educational establishment put down the idea of programming as a fundamental pedagogical goal: it was too difficult for children to learn, and

unlikely to improve learning in math and science.

However, since the seventies, researchers have been hard at work creating tools to make programming easier to learn. Programming tools such as Scratch (Resnick et al., 2009) and NetLogo (Wilensky, 1999) have achieved unprecedented popularity and made coding accessible to millions of students and teachers. The world caught up with the idea that not only computational media could be a vehicle for powerful ideas in mathematics, engineering, and science—an important new kind of literacy—but it was an approachable activity in schools.

Digital fabrication and 'making' could be a new and major chapter in this process of bringing powerful ideas, literacies, and expressive tools to children. Today, the range of accepted disciplinary knowledge has expanded to include not only programming, but also engineering and design (Astrachan, Hambrusch, Peckham, & Settle, 2009; Yasar & Landau, 2003). In addition, there are calls everywhere for educational approaches that foster creativity and inventiveness.

The analogy with the development of Logo is clear: simultaneously, digital fabrication technology became better and more accessible, and the intellectual activities enabled by the new technology became more valued and important. What Logo did for geometry and programming – bringing complex mathematics within the reach of schoolchildren – fabrication labs can do for design and engineering. Digital fabrication is Logo for atoms.

In this chapter, I will first briefly review the history of engineering education to show the rise and fall then rise again of the making and building as curricular foci. I then discuss the theoretical underpinnings of project-based, student-centered, constructionist learning, showing that much of what digital fabrication labs can enact was already predicted and advocated in the theories and writings of John Dewey, Seymour Papert, and Paulo Freire. The following section approaches the educational benefits of digital fabrication and how it could be a unique tool in the hands of progressive educators. In the final part of the chapter I present not only four prototypical episodes that exemplify the advantages and perils of FabLabs in schools, but also some guidelines for the design of learning environments incorporating these types of technologies.

1.2 Technological Knowledge: From Skills to Literacy

In 1999, the National Research Council issued a landmark report stating that technology was changing too fast for the 'skill-based' approach to be effective and instead called for a 'fluency' approach. They suggested technological education to include the development of adaptive, foundational skills in technology and computation, in particular "[intellectual] capabilities [to] empower people to manipulate the medium to their advantage and to handle unintended and unexpected problems when they arise" (National Research Council, 1999).

The same concerns were echoed in the later report, "Technically Speaking: Why All Americans Need to Know More About Technology," which confirmed the demise of the "computer skills" approach and recognized that decades had been lost teaching dated skills to millions of students. It called for a move

from 'computer skills' towards 'computational fluency' or 'literacy' (diSessa, 2000) and broadening technological literacy to include basic engineering knowledge, and the nature and limitations of the engineering design process (National Research Council, 2002).

The report also introduced an important distinction, which resonated with the concerns of educational theorists such as Seymour Papert and Andrea diSessa: the recognition of a difference between 'technological literacy' (a general set of skills and intellectual dispositions for all citizens) and 'technical competence' (in-depth knowledge that professional engineers and scientists need to know to perform their work). The distinction identifies fluency with technology as no longer a vocational skill or a way to train future science, technology, engineering and mathematics (STEM) workers, but knowledge valuable for every citizen. Since the publication of the 2002 "Technically Speaking" report, several other developments in research, technology and policy have further supported this need: the acceleration of technological innovation, further automation of routine jobs (Levy & Murnane, 2004), ubiquity of open-source hardware and software, and the development of low-cost digital fabrication tools (Gershenfeld, 2007). These national reports and societal developments are noteworthy because they signal the mainstream acceptance of Papert's once controversial vision. Taken together, the once dismissed idea of children programming computers was not only embraced, but developed into a much larger vision of students participating in sophisticated activities that were previously restricted to specialized professionals, such as robotics, environmental sensing, data analysis, advanced science, and engineering design.

1.3 The Demise of the Shop Class and the Rise of the Digital Fabrication Lab

Notwithstanding the natural content overlaps amongst science and engineering disciplines, they are fundamentally different. While a scientific investigation is typically concerned with finding the one law to explain many natural phenomena, a technological investigation typically finds many solutions for the same problem (Atkin, 1990). A typical school science lab is designed for rigorous, disciplined, and scripted experiences in which students are guided towards the re-discovery of a unifying principle. School science labs are architected to facilitate and optimize such a process—but would those spaces be appropriate for engineering and design?

Despite engineers' dependence on basic scientific knowledge to do their work, their epistemology even precedes science; humans have been creating tools and altering their environment much before the inception of the scientific method. In fact, engineers' 'ethos' as inventors and tinkerers, in both K-12 and college education, survived up to the fifties and sixties, after which there was a significant push towards analysis and mathematics, and away from traditional "shop work," (Grinter, 1955), which was overwhelmingly present in curricula during the first half of the 20th century (Dym, 1999). The 'professional engineer' of the first half of the 20th century was replaced by the 'scientific engineer' of the second half (Tryggvason & Apelian, 2006), mostly motivated by the end of the abundant Apollo-era funding—less expensive theoretical classes prevailed over engineering labs or design work (Feisel & Rosa, 2005). Over time, this resulted in the removal of the engineering design experience from not only college curriculum, but also from K-12 education. Shop class became "vocational education" for those

who supposedly could not handle 'serious' math or science.

Two independent processes started to reverse this trend. First, around the eighties, faculty and employers started to feel that the design-deprived engineering graduates were not well prepared do to any real engineering design work, which had started to become more important (Sheppard & Jenison, 1997). Second, in the early 2000s, prototyping equipment, such as laser cutters and 3D printers, dramatically dropped in price, and Open Source hardware further popularized these technologies. Suddenly, corporate product development moved towards a "studio" model in which groups of engineers and industrial designers could create prototypes in days instead of months: consequently the nature of product engineering was radically transformed. Gershenfeld and colleagues (Gershenfeld, 2007; Mikhak et al., 2002) at MIT were the first to package such equipment in a standardized low-cost lab and deploy it in both community centers and universities around the globe: the FabLab was born. Gershenfeld's network of FabLabs quickly spread in all five continents, and spurred a vibrant global movement. Four years later, in 2005, the MAKE Magazine, a monthly publication dedicated to DIY enthusiasts and tinkerers was created, and soon after the Maker Faire, a large science and engineering fair in California, launched with great success.

2. Dewey, Papert, and Freire: Theoretical Pillars for Digital Fabrication and 'Making' in Education

Toward the end of the 2000s, researchers and educators started to consider the use of digital fabrication in education. In 2008 Stanford University launched the FabLab@School project, and started building FabLabs in K-12 schools around the world. In 2009 the MC2STEM High School in Ohio (USA) opened its first digital fabrication lab. In 2011 the Maker Media launched the MakerSpace project with DARPA funding. In 2011 and 2012 alone countless museums, schools, community centers, and libraries announced plans to build digital fabrication and 'making' facilities—it became mainstream. Despite this resurgence of fabrication labs and "making" in formal and informal settings, the ideas behind this movement are at least a century old. Digital fabrication and "making" are based on three theoretical and pedagogical pillars: experiential education, constructionism, and critical pedagogy.

Since Rousseau's invention of childhood (Rousseau, 1961), progressive education theorists have been questioning the prevalent assumptions of their time regarding the project of education, and have been prescribing more experiential, student-centered approaches. The idea that education should be more experiential and connected to real-world objects is originally attributed to John Dewey but also to many other scholars and innovators (Dewey, 1902; Freudenthal, 1973; Fröbel & Hailmann, 1901; Montessori, 1964, 1965; von Glasersfeld, 1984).

Critical pedagogy scholars (Freire, 1974; Illich, 1970), Freire in particular, criticized school's "banking education" approach and the decontextualization of curriculum. Freire introduced the idea of culturally meaningful curriculum construction, in which designers get inspiration from the local culture toward creating "generative themes" with members of these cultures. Freire was also an advocate for education

as a form of empowerment, and argued that learners should go from the "consciousness of the real" to the "consciousness of the possible" as they perceive the "viable new alternatives" beyond "limiting-situations" (Freire, 1974). Therefore, students' projects should be deeply connected with meaningful problems, either at a personal or community level, and designing solutions to those problems would become both educational and empowering (Blikstein, 2008; Cavallo, 2000).

Seymour Papert shares Paulo Freire's enthusiasm for unleashing the latent learning potential of students by providing environments in which their passions and interests thrive. A mathematician by training, who then worked with Jean Piaget for many years, Papert pioneered the use of digital technologies in education. Yet Papert's reasons for advocating the use of computers in education are far from technocentric (Papert, 1987)—some of his motivations are very similar to Freire's. Papert's Constructionism builds upon Piaget's Constructivism and claims that the construction of knowledge happens remarkably well when students build, make, and publicly share objects. His theory is at the very core of what "making" and digital fabrication mean for education, and underlie what many enthusiasts of the "maker movement" propose—even if many are not aware of it. Papert's words describe precisely the relationship between making and learning: "Construction that takes place 'in the head' often happens especially felicitously when it is supported by construction of a more public sort "in the world" – a sand castle or a cake, a Lego house or a corporation, a computer program, a poem, or a theory of the universe. Part of what I mean by 'in the world' is that the product can be shown, discussed, examined, probed, and admired [...] It attaches special importance to the role of constructions in the world as a support for those in the head, thereby becoming less of a purely mentalist doctrine." (Papert, 1980, p. 142).

Papert advocates technology in schools not as a way to optimize traditional education, but rather as an emancipatory tool that puts the most powerful construction materials in the hands of children—again, another idea that inspired the resurgence of the 'maker' sensibilities. These protean machines which would enable students to design, engineer, and construct would cater to many forms of working, expressing, and building. This chameleonesque adaptivity, which is embedded in technology, permits the acknowledgement and embracing of different learning styles and epistemologies, engendering a convivial environment in which students can concretize their ideas and projects with intense personal engagement. In a typical Constructionist learning environment, there is rarely a fixed curriculum. Children use technology to build projects, and teachers act as facilitators of the process.

The Logo programming language was the first attempt in education to demonstrate that the computer is not only an information and communication device, but also an expressive tool for construction and self-expression. In the early nineties, Papert, Mitchel Resnick and Fred Martin extended the powerful ideas of Logo to the physical world by making robotics accessible to children through the Lego Mindstorms kit and the Cricket (Martin, 1994; Martin & Resnick, 1993), and together with collaborators did extensive work on robotics and 'making' workshops using microcontrollers and sensors (Resnick, Berg, & Eisenberg, 2000). Sipitakiat and Blikstein extended this work to developing countries and low-income communities by working with low-cost hardware as well as repurposed materials (Blikstein, 2008; Sipitakiat, 2000; Sipitakiat, Blikstein, & Cavallo, 2002, 2004). More recently, new developments are putting cutting-edge hardware and software in the hands of children to conduct advanced scientific

explorations (Blikstein, 2010; Blikstein, Fuhrmann, Greene, & Salehi, 2012), create interactive textiles (Buechley, 2006; Buechley & Eisenberg, 2008; Buechley, Eisenberg, Catchen, & Crockett, 2008), build electronic jewelry (Perner-Wilson, Buechley, & Satomi, 2011; Sylvan, 2005), design participatory simulations and games (Wilensky & Stroup, 1999), program videogames (Millner & Resnick, 2005; Kafai, 1995), design virtual robotic systems (Berland, 2008; Berland & Wilensky, 2006), create sophisticated 3D worlds and games through programming (Cooper, Dann, & Pausch, 2000), build new types of cybernetic creatures (Raffle, Parkes, & Ishii, 2004; Schweikardt & Gross, 2006) and explore environmental science and geographical information systems (Edelson, 2000).

These toolkits and technologies prepared the ground for the popularity of the 'maker' movement and digital fabrication. They showed that it was possible to engage children in complex uses of technology, that those same children could actively construct with technology rather than just consume technological products. They revealed how the ideas and intellectual passions of children could be powerful and generative, and that the perceived difficulties of many of those tasks were due to deficient design rather than learners' cognitive deficiencies. Rather than random developments, these new technologies, materials, and toolkits were deeply influenced by the theoretical constructs put forth by Dewey, Papert, and Freire, around constructive uses of technology, culturally-aware education, experiential learning, and interest-driven curricula.

3. Why Do We Need Digital Fabrication Labs in Schools?

The plethora of constructionist toolkits created and deployed in the 2000s, with improved and friendlier designs, coincided with the development of the FabLab concept by Neil Gershelfeld at MIT and the popularity of the Maker Faire—the perfect storm was in place. At that time, after having conducted tens of robotics and 'invention' workshops in schools, I was disappointed by the fact that students did not have a place to continue and deepen their projects—and projects would die after the workshop or the final expo. Schools manifest how they value a particular activity by building a space for it. If sports are important, schools build a gym and a basketball court. If music education is in demand, schools set up music rooms. Only then can likeminded students gather together, hang out, do projects, talk about them, and create a productive subculture in schools. Unfortunately, I realized that there was no such space for engineering and invention. Even when schools had robotics labs, they were highly gender-biased and not inviting for most students. Robotics labs and science labs were not disruptive spaces anymore. Therefore in 2008 I started to work with schools around the world to establish digital fabrication labs—the FabLab@School project was born.

I realized that digital fabrication had the potential to be the ultimate construction kit, a disruptive place in schools where students could safely make, build, and share their creations. I designed those spaces to be inviting and gender-neutral, in order to attract both the high-end engineering types, but also students who just wanted to try a project with technology, or enhance something that they were already doing with digital fabrication.

Both programming and educational robotics enhanced an existing activity with a powerful new

expressive medium. Logo programming reinvented differential geometry by adding computer algorithms to children's everyday bodily movements – forward, turn right, turn left. Robotics kits added computational behaviors to familiar materials – crafts, Legos, wheels – and behaviors – "light up if dark," "bounce off the walls," "follow the dark line." Each one of them made possible for new forms of expressiveness by adding a carefully designed technological layer to everyday, familiar materials and practices.

Digital fabrication is a new chapter in this story. Especially in low-income schools, students would often tell me that they used to 'make' and build things with their parents and friends, and often had jobs in garages, construction companies, or carpentry shops. However that experience was disconnected from their school life, since they did not see a link between the intellectual work in the classroom and the manual labor in the wood shop. Because of bias inherit within the educational system their own forms of engineering and tinkering, stripped down of any form of mathematical of scientific content, were looked down upon by society and by themselves.

Enhancing existing practices and expertise. One of the first and most striking results of the initial workshops in digital fabrication is that students reported have gained a new appreciation for the 'manual' labor they used to do, and also for the occupation of their parents. In the lab, students had to first design their creations on a computer, often after several types of measurements and calculations. However, they were still constructing, building, and using their hands, but all the work was permeated with two socially valued practices: computation and mathematics. Again, the familiar practices of building and making were augmented with computational tools, which generated not only more refined and sophisticated projects, but also empowerment and increased self-esteem. This proved to be a crucial Freirean principle for the design of digital fabrication experiences. By building onto students' familiar practices and adding a layer of expressive technologies, a digital fabrication lab, which merges computation, tinkering and engineering, has the potential to augment rather than replace familiar and powerful practices that students already possess, therefore they can recognize their own previous expertise in what they accomplish in the lab, rather than acquiring a new identity altogether.

Accelerate invention and design cycles. An additional benefit of digital fabrication is that it accelerates the processes of ideation and invention. It eliminates manual dexterity as the "middleman" in transforming an idea into a product, so students can focus their attention on improving the design rather than taking care of mundane issues with the materials—and many more cycles of redesign are possible in the same time interval. Moreover, as I consistently observed, the fact that the products generated in the laser cutter and the 3D printer were aesthetically pleasing had a strong impact in students' self-esteem—instead of taking home asymmetric and fragile cardboard prototypes, they were building functional 3D objects with a near-professional finish—it wasn't 'school stuff,' it was the 'real thing.'

Long term projects and deep collaboration. We also observed that the establishment of this new space in schools allowed students to engage in intellectual activities and practices that would not be possible anywhere else, and experience new ways of work and novel levels of team collaboration. A real engineering project takes several cycles of design and redesign. It does not fit the one-size-fits all 50-minute format. The digital fabrication lab provided a 'safe space' for long-term projects, which in turn

enabled students to face (alone or in groups) a new and intense experience: failure. Learning how to manage failure—something rarely taught in schools—ended up being another crucial educational benefits of the lab work. As we will see in many of the vignettes, through several cycles of failure and redesign, students not only achieved incredibly original and complex designs, but also became more persistent, learned to work in heterogeneous teams, and became better at managing intellectual diversity.

4. Four Vignettes and Many Lessons About Digital Fabrication in Education

In the following four vignettes, I will discuss positive and negative scenarios of the implementation of digital fabrication in education based on the categories I just described. I will exemplify some of the learning outcomes, and offer recommendations for the design and management of such spaces. Each vignette will illustrate one or two important principles, and in particular I will discuss (a) the dangers of trivialization, (b) the potential for deep engagement in projects of unprecedented complexity, (c) the power of interdisciplinary work; (d) Contextualized learning in STEM, and (e) intellectualization and re-evaluation of familiar practices.

4.1. The 'Keychain Syndrome', or the Temptations of Trivialization

For the first digital fabrication workshops we held in 2009, I designed introductory activities to get students acquainted with the machines: semi-structured short projects such as creating a keychain, a nametag, or an acrylic sign for a sports team. On a technical level these projects required students to learn how to cut and engrave using the laser cutter, use vector drawing software to create and combine geometric shapes, and import/manipulate bitmapped images from the web.

I assumed that by asking them to create highly-personal objects, such as keychains and nametags, students would get excited about the technologies not only because they would create objects for everyday use, but they would 'decorate' their rooms, school materials, and clothes with them, attracting the attention of family members and other students in the school. They would feel proud of their creations and associate their newly acquired engineering skill to the production of socially valued artifacts.

Students engaged with enthusiasm in the creation of their keychains. The plan worked. For the second session, they came back even more excited about their objects – parents, friends, even teachers wanted an acrylic keychain. Students lined up by the laser cutter to make more keychains. Excitement was in the air. Digital fabrication was succeeding, and students – both girls and boys – were very excited about "making stuff."

By the third session, my team had decided that it was time to move on to new activities – in particular, I wanted to introduce robotics and electronics. I rounded up students at the beginning of the session and ran a short robotics tutorial, teaching them how to hook up sensors and motors, and write simple

programs. At the end of the workshop, some students came to talk to me and asked permission to use the laser cutter for some new keychains. I postponed robotics for another day. By the fourth session, I knew something was wrong. The workshop became a keychain factory, and students would not engage in anything else. The plan worked too well – it backfired. Students found an activity that was personally meaningful, produced professional looking products that were admired and envied, and used a high-tech device. However, as much as it was a very effective solution to engage them in digital fabrication, it offered a too big reward for a relatively small effort, to produce an object that did not include any computation or complex constructive challenges. Ironically, it is as if students had discovered exactly what manufacturing is about – mass-producing with little effort – and were making the best of it. Students "cracked" digital fabrication and were using the lab as a fabrication facility, rather than a place for invention.

The following dialogue, which took place several days into the workshop, illustrates the seductions of the "keychain syndrome":

> Facilitator: What would you do if you had a laser cutter at home?
>
> Megan: I would make keychains.
>
> Nancy: Yeah, and sell 'em.
>
> Facilitator: Keychains? What kind?
>
> Megan: Like, these (she takes out a collection of keychains that she had recently printed)
>
> Facilitator: Anything else?
>
> Megan: No, just keychains.

But there was a more systemic issue at play – "friends and family" were focusing on the only values that they know, not coincidentally values which schools have traditionally focused on: valuing 'product' over 'process.' In that sense, digital fabrication is a type of Trojan horse: it introduces in schools a "genre" of tools that have the very special property of easily generating aesthetically pleasing, almost magical products. Therefore, for the student-creator, there is a conflicting incentive: (i) obfuscate the simplicity of the process ("I used this laser cutter machine, it's science fiction, it's really complicated"), and enhance the value of the product to others, or (ii) make the process transparent ("I used the laser cutter, it's actually not so hard to do keychains, the machine did most of the work!"), and reveal the triviality of the product.

For the educational designer and facilitator, it is fundamental to understand this incentive system to avoid this potentially harmful aspect of this 'genre' of machines. The feedback loop that the first incentive (obfuscating the simplicity of production) generates is that students get engrossed in the production of the same type of simple products. In the case of the second incentive, students are led to "un-trivialize" the product given the new level of product complexity that digital fabrication enables them to achieve. In the first case, despite appearances, we 'schoolify' and trivialize the lab, in the second, we make it a place for excellence and inquiry. The solution, however, is not inconsequential – while the product-over-process conundrum does not resolve itself, there will always be an incentive for simple,

well-polished products, as opposed to messy, complex, and potentially 'ugly' projects. Unless educational designers unveil the real incentive systems at play in the classroom, teachers who reward students based on quick completion times, quality of solution, and efficiency, might actually be fostering classrooms in which students rarely venture outside of what they already know (Abrahamson, Blikstein, & Wilensky, 2007).

The "keychain syndrome," therefore, revealed two of the crucial elements of learning environments based on digital fabrication. First, the equipment is capable of easily generating aesthetically attractive objects and products. Second, this generates an incentive system in which there is a disproportionate payoff in staying a 'local minimum' where the projects are very simple but at the same time very admired by external observers. Settling for simple projects is a temptation that educators have to avoid at all cost. The non-triviality of navigating these new incentive systems was one of the important lessons learned in these early workshops.

4.2. The Upside-down Roller Coaster, or the Power of Despair

Before coming to one of the digital fabrication workshops, John, Tyler, and Bob found themselves brainstorming about what to build. One of their oddest ideas was to build a roller coaster in their backyard. After the first few days of the workshop they decided to tackle it—but clearly more as a playful thing do to, without much hope of actually building it. Their first step was to scale down the project from a backyard to a 'tabletop' rollercoaster. They then imagined that the process would be quite straightforward: designing the tracks on a vector-drawing software, "printing" using the laser cutter, and assembling everything.

When they started the design, the first problem came about: how to make curved tracks with uniform width? They realized that they could not just use any type of lines to curve the track, as an uneven track would cause the car to get stuck. Their first challenge was to solve a geometrical puzzle: Should they make tracks using the freehand tool? Bezier curves? Other kinds of curves? Should they create two perfect arcs? Should the arcs have the same radii?

In such an environment, there are no right answers, so these debates take a long time. After a day of discussions and experimentation, they ended up using arcs to create the smoothest possible curve while retaining the width of the track, and printed them out on the laser cutter. However, they realized that they had another problem in hands: the sharpness of the turns, which would make the car "lose most of its speed." After much bending and warping of the track, they eventually decided to scrap this design and start from scratch. Tyler worked on the new design, now with much wider turns, which seemed to work better (see Figure 1).

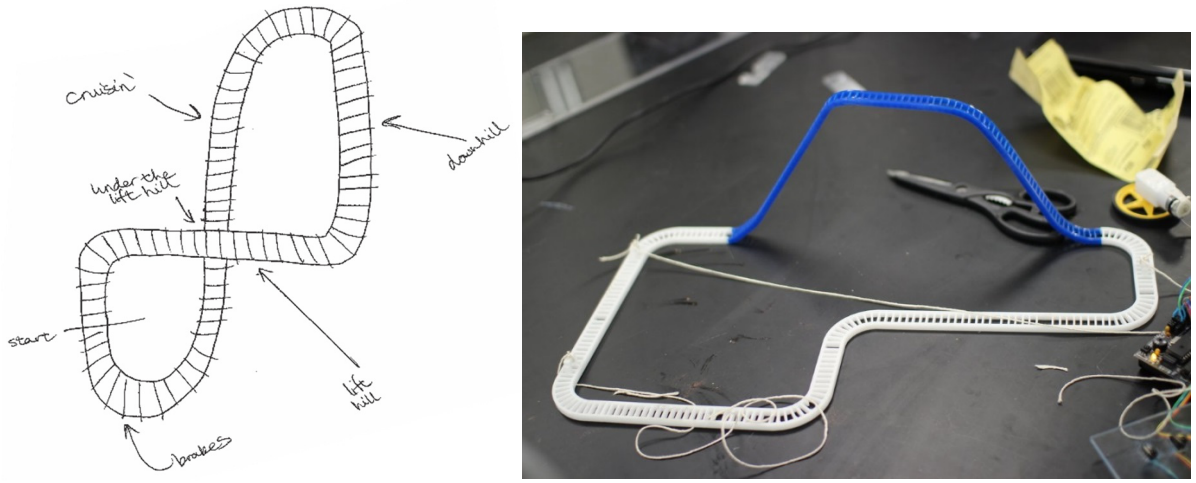

Figure 1. The initial plan for the rollercoaster track (left), and the second design (right)

Another problem that presented itself was the car. Several ideas were proposed for its design. Initially students were considering a normal rollercoaster car that would just roll on top of the track. They tried several designs, with and without wheels, but soon realized that friction was again making the car lose speed. After much brainstorming, they came up with a new idea: a hanging car under the track, which would have much less contact area and thus minimize friction. The group then designed the hanging car and printed it on the 3D printer. However, another problem arose: students realized they would have to suspend the track so that the car would not touch the table, and could not think of a reasonable way to accomplish it and maintain balance. They went back to the car-on-top idea, now with a better design for the wheels. After a day of hard work, they thought they had the final design, and printed everything. The first test was a disaster: the car did not have enough power to make it around the entire track. The original idea was to rig a device to bring the car to the top of the big hill, and let gravity do the rest. Students attempted several methods to bring the car to the top of the hill, from using magnets to attempt to pull the car up the track, to using a string towrope to pull it up the hill. After hours of failed experiments, they came to an even more devastating realization. Gravity would not provide enough energy to make the car go around the entire track—too much momentum was lost in turns and due to friction, and the plastic car was too light to accumulate enough potential energy. They gave up on gravity, and started considering other options. Their next idea was to rig a sail up on the car and use a battery-powered propeller to provide wind. But they again ran into problems, first with attaching the sail, then with the issue that the force applied to the sail pushed the nose of the car down without moving it. They realized this was due to one of two elements: either the fact that they were using a central wheel system, thus not providing stability in the front or back, or that the wheel system was not providing enough grip, thus the car was not stable enough. Students threw the design out the window, and one team member gave up on the project.

At this point, the rest of the team was desperate, asking everyone in the lab for ideas and help. They had spent almost two weeks on the project and nothing seemed to work – frustration was in the air. Some facilitators volunteered to help and come up with new ideas, and when just about everything seemed to

be a failure, one revolutionary idea emerged: instead of having the car go around the track, why not make the track go around the car? The main problems arose from the fact that it was too difficult to power a tiny car without any motors, since the car was too small for that. So what about turning the problem on its head, and move the track instead? The suggested a design would treat the track as a puppet, with strings attached to each of its corners, and motors pulling them up and down – then they could easily use gravity again. Students took on the challenge, printed another track, created an acrylic frame, attached motors and programmed the GoGo Board (Sipitakiat et al., 2004), and in a few hours had a working prototype (Figure 2.)

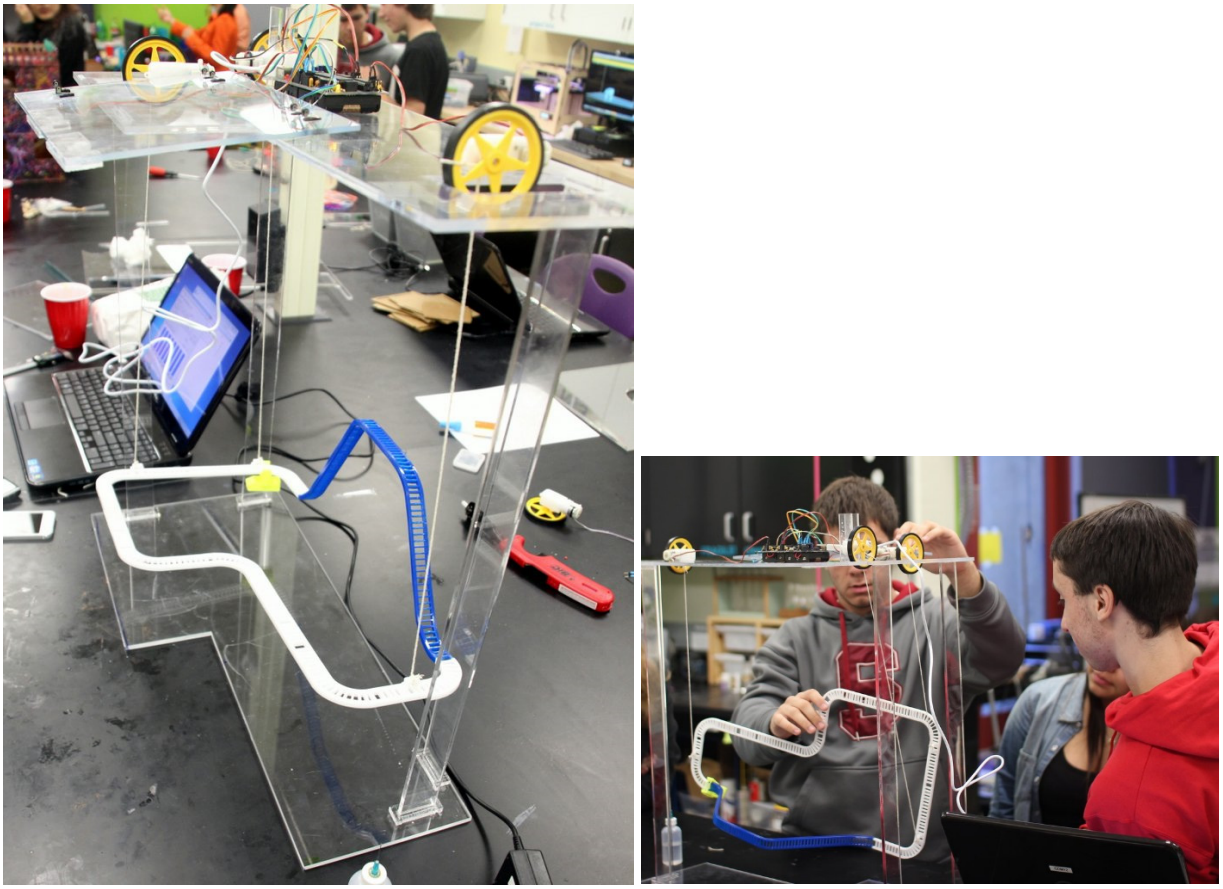

Figure 2. The upside-down rollercoaster

This episode illustrates the working dynamics in a digital fabrication lab or 'maker space' along many dimensions. First, it promoted contextualized encounter with scientific knowledge and lexicon. During the two weeks of the project, students struggled with several physics problems, some of which they knew about but had never seen in real life. Their dialogue, which initially was about the "losing speed," became increasingly complex, rigorous, and compliant with the lexicon of physics: for example, "speed" became "momentum," and the generic statement that the car was "losing speed" was later decoupled into friction, number of turns, angle of turns, and lack of initial potential energy. They also identified several causes for friction, and discussed ways to minimize it by reducing the surface area, the friction

coefficient, or making the car hang from the track. Physics, engineering, and problem solving were organically connected a part of a seamless process, which is what happens when professional engineers work on projects.

Second, the space was flexible with students' contrasting attitudes towards failure. The narrative of this episode is as baffling and meandering as the project development was. There were no easy answers for the problems that students were facing. The group went through a complex process, filled with frustration, failure, but also exhilarating success in the end. While Tyler, Bob, and John worked together for almost the entire program, they had very different styles in going about their projects. As a team, Tyler's optimism in the face of adversity worked as a great balance to John's aptitude for ideating. While John often drove the start of projects, it was Tyler who would use the inevitable failures to advance their goal. Tyler would often tell John "Things never work the first time, and that's okay." Almost every day they hit a fundamental problem with their design, and consistently came up with means to work through it. While Tyler took the constant setbacks in stride, accepting them as part of the engineering process, John considered them instead as embarrassing failures. Despite these differences, the team showed remarkable perseverance throughout in the project, and was able to use their different approaches to failure as a feature of their collective strategy of problem solving, rather than a difficulty. These students were able to experience realistic engineering design because they had the space and time to fail and try again, and a strong motivation to pursue their own idea. In short-term projects, scripted construction challenges, or time-constrained competitions, the class dynamics would have been radically different, and students would never have been able to experience these dramatic levels of failure and reward. Ultimately, their deep sense of achievement was a consequence of their visceral involvement in the construction of the rollercoaster, and the originality of their design was only possible because of the technical and emotional support that they had in order to withstand extended frustration, shake it up, and go back to the drawing board.

4.3. "The Most Math I Have Ever Learned in a History Class," or the Power of Interdisciplinary Projects

Digital fabrication is typically associated with the learning and practice of STEM disciplines. Laser cutters and 3D printer are "hard sciences" territory, and supposedly math and science teachers should be the ones primarily involved. In one of the projects in the Lincoln school, however, we had an unlikely scenario: Heather, a history teacher with many years of experience, wanted to bring her four 8th grade classes to the lab. She was not a typical early adopter of a digital prototyping lab – in one of our surveys, she rated herself at the bottom of the scale in knowledge about robotics, mechanical engineering, and computer programming. But Heather was not concerned in training future STEM workers. Her main goal fell within the disciplinary boundaries of History: she wanted her students to learn about great female characters in American history by building historical monuments for them, using 3D printing and laser cutting.

Heather's project illustrates two aspects of the implementation of digital fabrication in classrooms. First, I will show how she prepared herself for, and structured the activity. Second, I will narrate how a

complex and productive "division of labor" emerged from the project as a result of the interactions between the technical lab teacher and Heather.

She had gone through the digital fabrication training workshop and had basic understanding of how most of the equipment worked. Initially, she was not comfortable using the laser cutter by herself, though. However, we had set up the lab with a full time technical lab person that could help teachers and students to operate and learn the machines. Thus Heather did not feel she had to master all the tools before starting to work with her students, or that she would be alone with the students exploring all of the unfamiliar territory of the lab.

Even though Heather was not well versed in programming or engineering, she was comfortable using unfamiliar technologies in her classroom. Part of her method was to experiment with the technology 'as a learner' before even starting working with students. Therefore, two days before the start of the digital fabrication activity, she created her own historical monument using the digital fabrication equipment. She went through the entire process herself and understood the challenges and difficulties in building it. Thus when she started working with students, she not only felt more comfortable facilitating the activity, but could also predict bottlenecks and difficulties. She became aware of how much technical expertise was needed to facilitate the project, and realized that the help of the lab's technical coordinator, David, would be crucial. As the activity unfolded, Heather's role evolved to be a project manager, and David's to be a design helper and an equipment operator. Heather set class goals, checked in on the groups, volunteered to laser cut pieces for them in her spare time, and kept track of time. David would sit by the laser cutter most of the time, not interfering with the girls' designs, and acting mostly as a facilitator and consultant. His help was instrumental in moving many groups forward. When the students had a very difficult technical challenge to solve, David had the ability to envision how the entire system should work and give life-saving suggestions. Most students did not have the ability to look at their work as a system, but on interactions between one or two parts at most. David would guide them throughout the process, not taking over or undermining their ideas, but co-designing. The work dynamics that Heather and David put in place was different from a traditional classroom, of course, but it was also a departure from many technology-based after school programs where there is no space for a person with Heather's profile.

In a robotics workshop, each group has its own equipment and work autonomously. In a digital fabrication environment, however, the work is centralized in just one or two machines. The question, then, is deciding on the side of efficiency (one specialist operating the machine for everyone), or equity (everyone operating the machine). In Heather and David's model, the workflow was faster, but there was doubt if the girls were actually learning while watching David work through problems, or if they were simply relieved to have something done for them, and if they could come up with elegant solutions without him.

This assembly-line division of labor made it possible for students to get their parts cut in 50-minute periods. However, there were unintended consequences to this scheme. Some students may have prematurely aborted design elements that they deemed too difficult to do on their own, given the time constraint. In addition, the amount of experience Heather's students had with fabrication varied from

group to group. It seemed like there was a place for every student on the spectrum to fit in. Some groups required more technical (and mathematical) help than others, but the students all seemed to be in charge of the creative part of their designs. However, it was unclear whether David was being helpful by doing some of the more complex calculations for the students or simply passing the information along to the students. At this point the aim was efficiency; and it could have undermined students' willingness to persist through difficult problems.

Heather also made changes to her own activity design. Instead of a completely open-ended project, she introduced some structure: the wooden base of the historical monuments would be standardized (a 15x15 square grid with a 3/16":1 ft scale, see Figure 3, left).

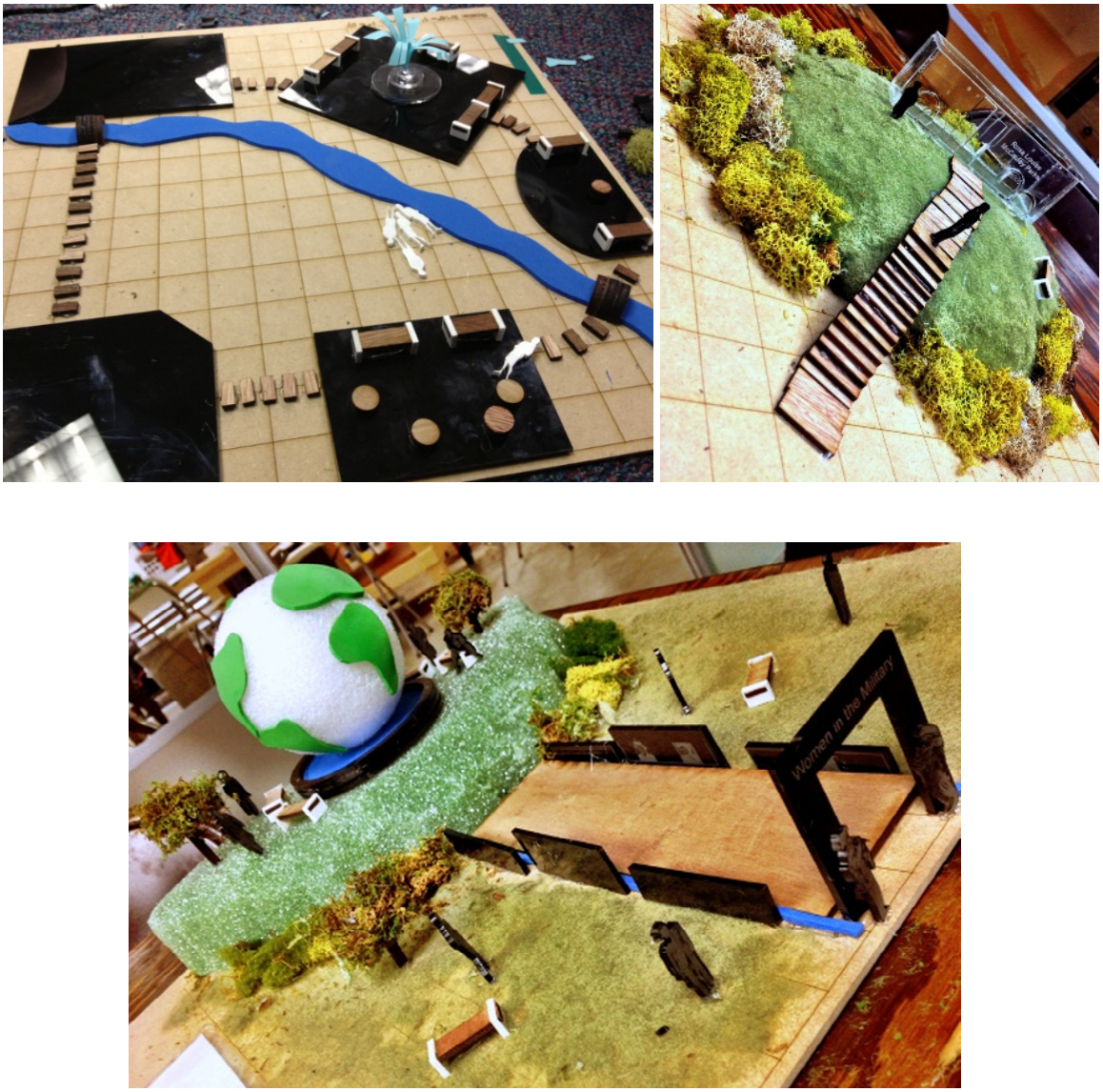

Figure 3. One in-progress project with the grid clearly visible (left), and some of the projects done by students (right, bottom)

Heather's activity design, which was intended to give students a safe starting point for their projects, had an unexpected consequence as well. The activity, which was originally a history project, suddenly became a sophisticated mathematics project. When Heather standardized the base and assigned strict dimensions to it, she foregrounded one aspect of the activity that would have been overlooked by many students: measurement. All of a sudden, the objects had to fit the base and their relative sizes had to be exact. Students did not want to have a park bench be the same size as a person, and they knew they could not tinker with the dimensions of objects after the fact. In the post-interviews, students were very surprised with how much math they had to learn and use to accomplish the history project.

The History Monuments project unwittingly illustrated some additional principles of digital fabrication in schools. First, digital fabrication introduces a new type of 'workflow.' Differently from a science lab or a robotics workshop, in which each group works autonomously with one kit, in a FabLab there is just one laser cutter. This generates pressure for productivity and division of labor that could be either productive or disempowering. In Heather's case, the scheme was mostly productive in which it enabled students to focus on the creative part of the project, not having to deal with the specifics of the software and the laser cutter. In fact, the division of labor was also a crucial enabler for the project to happen within the four 50-minute time slots that she had. However, we also observed that this scheme could easily turn into a disempowering arrangement when students realize that they are too dependent on the facilitators and cannot create the more complex designs by themselves—all the hard work is done by eager facilitators racing against the school bell.

Second, the environment was conducive to unlikely interdisciplinary projects**:** The making of a physical project will always entail some engineering work. Despite the fact that students were working on a history-themed project, they ended up having to explore multiple topics in mathematics such as measurement, scale, and proportion, both in two and three dimensions. In the same way that the rollercoaster students encountered physics in authentic ways, the 'Monuments' students were seeing mathematics everywhere in their projects.

4.4. The Robotic Flute Player, or the Demise of Constant Airflow

Max, a high school student in Moscow, was not an engineering type. He was passionate about music—Bach in particular. In one of our first meetings, he told the facilitators his childhood dream was to build a robot that could play Bach—thus his interest in digital fabrication, although he had no idea where to start. After a week, he had learned how to laser cut, program, control motors and sensors, and had an incredible prototype of the flute. It was not yet good enough for him. The workshop was over, but now finishing the flute was his personal project, so he kept coming to the lab for two months, several times a week. In the end, he built a flute with 12 servomotors (Figure 4), a highly complex control mechanism, and was able to play some simple Bach melodies by programming the microcontroller board. He took this project to the National Science Exhibition, a very competitive event in Russia with hundreds of students from all over the country, and won 3rd place. It seems like a success, but the competition was not the most important part of the story.

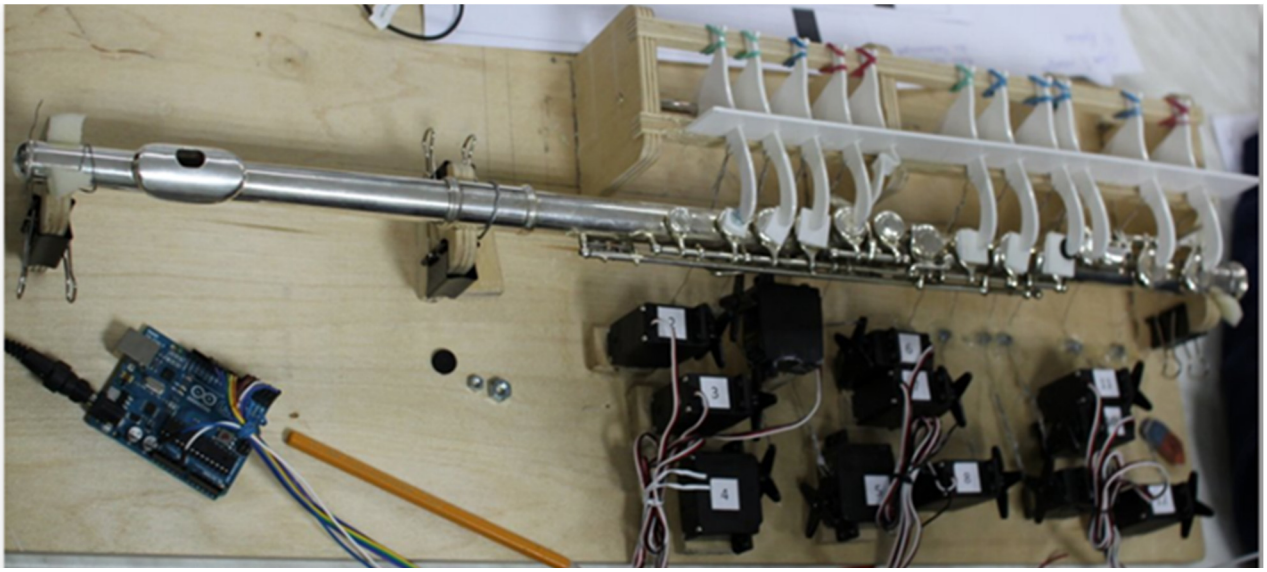

Figure 4. The robotic flute.

Apart from controlling the robotic "fingers," Max also wanted a machine to blow air into the flute. For several weeks, he tried many solutions—foleys, pumps, vacuum cleaners, and even complex piping systems. After countless experiments and redesigns, he finally found a way to blow a consistent amount of air at just the right angle to produce sound. He decided to use an inverted vacuum cleaner with a series of polymer-cast pipes which he made himself. Max turned the system on, started the servo motor system, and waited for the contraption to play Bach—when something remarkable happened. Even though the system was working as planned, it did not sound like a Bach piece. Something was off: the movements were correct, the air was flowing steadily, but it was not what he expected. After much reflection with the facilitators, Max finally understood the problem. No human flute player would have a steady flow of air – regulating the airflow is exactly the craft of musicians, who interpret the melody in their own way, emphasizing and highlighting different parts. Bach pieces sound weird when played by a robot because there is no interpretation, just an automatic execution with constant airflow.

Max was disappointed but also extremely happy, too – by building a robotic flute, he had learned a lot about engineering, but the main lesson was about music interpretation, and the true craft of a musician. His episode illustrates, again, the integrated nature of projects in the lab, where there is no real boundary between disciplines. But even more importantly, it shows a crucial component of the lab's success: attracting students who would not traditionally see themselves as engineers or scientists. Since the lab was architected (and advertised) as a place for invention—and not for "building robots" or making lights blink—even students like Max felt compelled to try something. His contribution, as a musician/engineer, made the environment more diverse and intellectually rich, attracted even more students, and infused unexpected ideas into other students' work.

5. Digital Fabrication and 'Making:' the Ultimate Construction Kit

In this chapter, I first told the story of the rise and fall then rise again of the making and building in education, discussed the theoretical underpinnings of project-based, student-centered learning, and presented the work of John Dewey, Seymour Papert, and Paulo Freire. I discussed how digital fabrication brings unique tools to progressive educators, and presented four prototypical episodes that exemplify the advantages and perils of FabLabs in schools. These examples highlight five important design principles:

(a) **The "Keychain Syndrome:"** since digital fabrication machines might generate aesthetically-pleasing products with little effort, educators should shy away from quick demonstration projects and push students towards more complex endeavors;

(b) **The power of despair and visceral involvement:** FabLabs provide an environment for unprecedented visceral design experiences, multiple cycles of design, and new levels for both frustration and excitement, which students normally do not experience in their normal school experience;

(c) **Powerful interdisciplinary projects:** the artificial boundaries between disciplines are completely reconfigured in the lab. History and mathematics become closely related, and so do music and robotics, and this richness results in a more diverse and accepting intellectual environment;

(d) **Contextualized learning in STEM:** students have the opportunity to come across several concepts in engineering and science in a highly meaningful, engaging, and contextualized fashion. Abstract ideas such as friction and momentum become meaningful and concrete when they are needed to accomplish a task within a project; math becomes a necessity in a history project.

(e) **Intellectualization and re-evaluation of familiar practices, rather than the replacement of existing ones (Blikstein, 2008):** Students bring their own familiar practices to the lab (craft, construction, carpentry), and those practices get augmented using socially-valued tools such as computational and mathematics. The malleability of the equipment and the pedagogical space in the lab makes the augmentation and embracement of such practices feasible, generating an environment that values multiple ways of working.

Despite the potential of digital fabrication labs and 'making' in education, educators and scholars must remember that, as Seymour Papert would say, the real power of any technology is not in the technique itself or in the allure it generates, but in the new ways of personal expression it enables, the new forms of human interaction it facilitates, and the powerful ideas it makes accessible to children.

6. Acknowledgements

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7. References

Abrahamson, D., Blikstein, P., & Wilensky, U. (2007). *Classroom model, model classroom: computer-supported methodology for investigating collaborative-learning pedagogy*. Paper presented at the Proceedings of the 8th International Conference on Computer Supported Collaborative Learning, NJ: Rutgers University.

Astrachan, O., Hambrusch, S., Peckham, J., & Settle, A. (2009). *The present and future of computational thinking*. Paper presented at the Proceedings of the 40th ACM technical symposium on Computer science education, Chattanooga, TN, USA.

Atkin, J. (1990). Teach science for science's sake: For Global Competitiveness, try technology. *Education Week, 10*, 32.

Berland, M. (2008). *VBOT: Motivating Computational and Complex Systems Fluencies with Constructionist Virtual/Physical Robotics.* PhD., Northwestern University, Evanston.

Berland, M., & Wilensky, U. (2006). *Constructionist collaborative engineering: Results from an implementation of PVBOT*. Paper presented at the Annual meeting of the American Educational Research Association, San Francisco, CA.

Blikstein, P. (2008). Travels in Troy with Freire: Technology as an Agent for Emancipation. In P. Noguera & C. A. Torres (Eds.), *Social Justice Education for Teachers: Paulo Freire and the possible dream* (pp. 205-244). Rotterdam, Netherlands: Sense.

Blikstein, P. (2010). *Connecting the science classroom and tangible interfaces: the bifocal modeling framework*. Paper presented at the Proceedings of the 9th International Conference of the Learning Sciences - Volume 2, Chicago, Illinois.

Blikstein, P., Fuhrmann, T., Greene, D., & Salehi, S. (2012). *Bifocal modeling: mixing real and virtual labs for advanced science learning*. Paper presented at the Proceedings of the 11th International Conference on Interaction Design and Children, Bremen, Germany.

Buechley, L. (2006). *A Construction Kit for Electronic Textiles.* Paper presented at the IEEE International Symposium on Wearable Computers (ISWC), Montreux, Switzerland.

Buechley, L., & Eisenberg, M. (2008). The LilyPad Arduino: toward wearable engineering for everyone. *IEEE Pervasive Computing, 7*(2), 12-15.

Buechley, L., Eisenberg, M., Catchen, J., & Crockett, A. (2008). *The LilyPad Arduino: using computational textiles to investigate engagement, aesthetics, and diversity in computer science education*.

Cavallo, D. (2000). Emergent Design and learning environments: Building on indigenous knowledge. *IBM System Journal, 39*(3&4), 768-781.

Cooper, S., Dann, W., & Pausch, R. (2000). *Alice: a 3-D tool for introductory programming concepts.* Paper presented at the Journal of Computing Sciences in Colleges.

Dewey, J. (1902). *The Child and Curriculum*. Chicago, IL: University of Chicago Press.

diSessa, A. A. (2000). *Changing minds: computers, learning, and literacy*. Cambridge, MA: MIT Press.

Dym, C. L. (1999). Learning Engineering: Design, Languages, and Experiences. *Journal of Engineering Education*, 145-148.

Edelson, D. (2000). My World GIS. Evanston, IL: PASCO Scientific.

Feisel, L. D., & Rosa, A. J. (2005). The Role of the Laboratory in Undergraduate Engineering Education. *Journal of Engineering Education, 94*(1), 121-130.

Freire, P. (1974). *Pedagogy of the oppressed*. New York,: Seabury Press.

Freudenthal, H. (1973). *Mathematics as an educational task*. Dordrecht,: Reidel.

Fröbel, F., & Hailmann, W. N. (1901). *The education of man*. New York: D. Appleton.

Gershenfeld, N. (2007). *Fab: the coming revolution on your desktop--from personal computers to personal fabrication*: Basic Books (AZ).

Grinter, L. E. (1955). Report on Evaluation of Engineering Education. Washington, DC: ASEE.

Illich, I. (1970). *Deschooling society*. New York: Harper & Row.

Kafai, Y. (1995). *Minds in Play. Computer Game Design as a Context for Children's Learning*. Norwood: Lawrence Erlbaum Associates

Levy, F., & Murnane, R. J. (2004). *The new division of labor: How computers are creating the next job market*: Princeton University Press.

Martin, F. (1994). *Circuits to Control: Learning Engineering by Designing LEGO Robots.* MIT, Cambridge, MA.

Martin, F., & Resnick, M. (1993). Lego/Logo and electronic bricks: Creating a scienceland for children. In D. L. Ferguson (Ed.), *Advanced educational technologies for mathematics and science*. Berlin, Heidelberg: Springer-Verlag.

Mikhak, B., Lyon, C., Gorton, T., Gershenfeld, N., McEnnis, C., & Taylor, J. (2002). Fab Lab: An Alternative Model of ICT for Development."development by design"(dyd02). *Bangalore: ThinkCycle*.

Millner, A., & Resnick, M. (2005). *Tools for Creating Custom Physical Computer Interfaces.* Paper presented at the 4th International Conference for Interaction Desing for Children, Boulder, CO.

Montessori, M. (1964). *The advanced Montessori method*. Cambridge, Mass.,: R. Bentley.

Montessori, M. (1965). *Spontaneous activity in education*. New York,: Schocken Books.

National Research Council. (1999). *Being Fluent with Information Technology*: The National Academies

Press.
National Research Council. (2002). *Technically Speaking: Why All Americans Need to Know More About Technology*: The National Academies Press.
Papert, S. (1980). *Mindstorms : children, computers, and powerful ideas*. New York: Basic Books.
Papert, S. (1987). Computer Criticism vs. Technocentric Thinking. *Educational Researcher, 16*(1).
Papert, S. (1991). Situating Constructionism. In S. Papert & I. Harel (Eds.), *Constructionism*. Cambridge, MA: MIT Press.
Perner-Wilson, H., Buechley, L., & Satomi, M. (2011). *Handcrafting textile interfaces from a kit-of-no-parts.* Paper presented at the Proceedings of the fifth international conference on Tangible, embedded, and embodied interaction.
Raffle, H. S., Parkes, A. J., & Ishii, H. (2004). *Topobo: a constructive assembly system with kinetic memory.* Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems.
Resnick, M., Berg, R., & Eisenberg, M. (2000). Beyond black boxes: Bringing transparency and aesthetics back to scientific investigation. *Journal of the Learning Sciences, 9*(1), 7-30.
Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., Brennan, K., . . . Silverman, B. (2009). Scratch: programming for all. *Communications of the ACM, 52*(11), 60-67.
Rousseau, J.-J. (1961). *Emile*. New York: Dutton.
Schweikardt, E., & Gross, M. D. (2006). *roBlocks: a robotic construction kit for mathematics and science education*. Paper presented at the Proceedings of the 8th international conference on Multimodal interfaces, Banff, Alberta, Canada.
Sheppard, S., & Jenison, R. (1997). Examples of Freshman Design Education. *International Journal of Engineering Education, 13*(4), 248-261.
Sipitakiat, A. (2000). *Digital Technology for Conviviality: making the most of learners' energy and imagination.* MSc. thesis, Massachusetts Institute of Technology, Cambridge.
Sipitakiat, A., Blikstein, P., & Cavallo, D. P. (2002). *The GoGo Board: Moving towards highly available computational tools in learning environments.* Paper presented at the Interactive Computer Aided Learning International Workshop, Villach, Austria.
Sipitakiat, A., Blikstein, P., & Cavallo, D. P. (2004). *GoGo Board: Augmenting Programmable Bricks for Economically Challenged Audiences.* Paper presented at the International Conference of the Learning Sciences, Los Angeles, USA.
Swetz, F., & Smith, D. (1987). *Capitalism and arithmetic: The new math of the 15th century*: Open Court.
Sylvan, E. (2005). *Integrating Aesthetic, Engineering, and Scientific Understanding in a Hands-on Design Activity*. Paper presented at the Interaction Design for Children, Boulder, CO.
Tryggvason, G., & Apelian, D. (2006). Re-engineering engineering education for the challenges of the 21 st century. *JOM, 58*(10), 14-17.
von Glasersfeld, E. (1984). An Introduction to Radical Constructivism. In P. Watzlawick (Ed.), *The Invented Reality*. New York: Norton.
Wilensky, U. (1999). NetLogo. Evanston, IL: Center for Connected Learning and Computer-Based Modeling. http://ccl.northwestern.edu/netlogo.

Wilensky, U., & Papert, S. (2010). *Restructurations: Reformulating knowledge disciplines through new representational forms.* Paper presented at the Constructionism 2010, Paris, France.

Wilensky, U., & Stroup, W. (1999). *Learning Through Participatory Simulations: Network-Based Design for Systems Learning in Classrooms.* Paper presented at the Computer Supported Collaborative Learning Conference, Stanford University, California.

Yasar, O., & Landau, R. H. (2003). Elements of computational science and engineering education. *SIAM review*, 787-805.

Submissions Course Outline Editor

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Business and Social Sciences

LINC 84B 3-D DESIGN & FABRICATION

Edit Course Outline

LINC 84B **3-D DESIGN & FABRICATION** **Summer 2018**

2 hours lecture. **2 Units**

Total Contact Hours: 24 *(Total of All Lecture and Lab hours X 12)*

Total Student Learning Hours: 72 *(Total of All Lecture, Lab and Out of Class hours X 12)*

Lecture Hours: 2 **Lab Hours:** 0 **Weekly Out of Class Hours:** 4

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option

Degree Status: Applicable **Credit Status:** Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:**

Division Dean Information -

Seat Count: 35 **Load Factor:** .044 **FOAP Code:** 114000151011086000

Cross Listed as:

Related ID: LINC 84A

Instruction Office Information -

FSA Code:

Distance Learning: yes

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course provides specialized training for strategic partners in college vocational programs, high schools, economic development initiatives, ROP, and capacity development projects for stakeholders in grades K-12. The primary target audience includes educators and students from school districts within the FHDA district service area: Mountain View-Whisman, Palo Alto Unified, Sunnyvale Elementary, Mountain View-Los Altos Union HSD, Los Altos Elementary, Fremont Union HSD, and Cupertino Union. The secondary target audience includes schools and residents throughout San Mateo, Santa Clara, Santa Cruz, and Alameda counties.

1. Description -

Intended for educators and others, this course will provide the fundamentals of 3-D design and fabrication concepts. The use of basic design software and online libraries will be used to assist in developing and designing 3-D projects for learning projects by students in grades K-12, business, industry, and/or governmental. An emphasis will be placed on design concepts to meet a specific educational/instructional/project need.

Prerequisite: None

Co-requisite: None

Advisory: Experience with internet software tools, browsers, hyperlinks, online media resources, and basic skills using a computer.

2. Course Objectives -

The student will be able to:

A. Identify different types of 3-D fabrication techniques
B. Access, download and modify 3-D printing files from online collections
C. Evaluate the best media for the 3-D print job based upon the use requirements
D. Establishing design criteria and scale to maintain interoperability for multiple part projects
E. Develop and submit a finished 3-D fabricated item

3. Special Facilities and/or Equipment -

A. When offered on/off campus: Lecture room equipped with LCD projector, whiteboard, and a demonstration computer connected online. Computer laboratories equipped with online PCs and/or Macintosh computers, network server access, and 3-D printer(s).
B. When taught via the internet: Students must have current email accounts and/or ongoing access to computers with email software, web browsing capability, and access to the World Wide Web.

4. Course Content (Body of knowledge) -

A. 3-D Fabrication Techniques
    1. 3-D Printing--Filament Based (PLA/ABS)
    2. 3-D Printing--Resin Based
    3. 3-D Printing--CNC
    4. Laser Cutting
B. Online 3-D Printing Collections
    1. Thingiverse
    2. Tinkercad
    3. Inventables
C. Types of Media Used in 3-D Fabrication
    1. Filament (PLA/ABS)
    2. Resin
    3. Wood
    4. Plastic Sheeting
D. Design Criteria
    1. Material
    2. Size
    3. Strength
    4. Weight
    5. Accuracy
E. Finishing and Assembly
    1. Techniques to Remove Excess Material
    2. Dry Fitting Multiple Piece Projects to Ensure Proper Fit

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

The student will demonstrate proficiency by:

A. Developing a project utilizing 3-D design and fabrication technologies for the participant's specific purposes, whether educational, business-related or personal.
B. Presentation of their web-based design and 3-D printed/fabricated project to peers.
C. Making constructive contributions to class discussions.

7. Representative Text(s) -

Instructor-assigned notes and materials.

Example textbook:
Horvath, Joan. Mastering 3-D Printing. Apress Media, 2014. Print.

Additional information, notes, handouts, syllabus, assignments, tests, and other relevant course material will be delivered by email and on the World Wide Web, and discussion may be handled with internet communication tools.

8. Disciplines -

Instructional Design/Technology

9. Method of Instruction -

During periods of instruction the student will be:

A. Listening actively to lecture presentations delivered in student-centered learning style by taking notes, following demonstrations, or completing an activity
B. Participating in facilitated discussions of live presentations, readings or video presentations
C. Presenting in small group and whole class situations

10. Lab Content -

Not applicable.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Each week requires the student to read and analyze selected websites or student projects related to that week's topic.
B. Each week's topic requires a written response to a prompt that is turned in to the instructor for review. Each prompt is designed to be a draft of a section of the student's completed project. Instructor feedback should be reflected in the final product.
C. Each week's topic requires the student to participate in a weekly discussion prompt based on that week's readings and assignment. Students are to respond to other students' responses offering support, suggestions, alternative ideas, and resources.

FOOTHILL COLLEGE
College Curriculum Committee
Exception Process for Starting Courses Prior to Catalog Publication

Background

To help student educational planning, Foothill College's normal practice has been to not offer a course prior to publication in the college catalog. However, there are cases in which it would be beneficial to students to run a course prior to publication; for example, the availability of noncredit courses to support student success, prerequisite changes based on C-ID, changes in workforce needs, permanently Stand Alone CTE courses, programmatic accreditation changes, etc. In order to provide flexibility to best serve students, this process allows for an exception to the current practice.

Note our current practice that **new programs** approved by the CCCCO become active immediately, as long as the program courses have previously been published in the catalog.

Process

The following process should be followed to request an exception:

A. Course outline of record (COR) must be created/updated in C3MS and approved by the division (in Review1 status in C3MS). All forms and SLOs completed.
B. The Division Curriculum Reps would email the request to the Office of Instruction.
C. Request must include the course number(s) as well as the specific reason for the request. If applicable, documentation from the outside entity regarding the change must be attached to the request.
D. The Office of Instruction reviews the request, which includes determining a timeline for activation.
E. If approved, the request is reported to CCC.