Outline and Supporting Materials

The Underware: Strategies for Enabling Student-Constructed Learning in Music Technology Courses, ATMI/CMS, Quebec City, November 2005

Peter R. Webster, Northwestern University School of Music pwebster@northwestern.edu
David B. Williams, Illinois State University School of Music dwilliam@ilstu.edu
(This document may be found at http://www.emtbook.net)

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I. Outline of Presentations

Why This Topic?
Important to Focus on the Underlying Principles of Course Design: The "Underware"
Place Less Emphasis on Knowing Details of Software and Hardware--More on Principles
Music Activities as the Center for Knowledge and Skill Development
Develop Creative Problem-Solving in Independent and Group Settings
Make Connections to Other Aspects of the Music Curriculum
Emphasis on Life-Long Experiences
Share our own experiences, instructional design, and materials

Session I: Sharing Our Experiences

The Challenge of Class Design Sharing Elements from our Teaching Experiences
Nature of Constructivist Thinking Common/Uncommon Threads
What Has Not Worked

Session II: Sharing Student and Your Experiences

Examples of Student Work Survey Results
Why not Constructivism as an Approach? Discussion

Outline of Key Points

The Challenge of Class Design
Lecture Hands-On; Skill Based
Lecture/Demo Combinations of the above

Nature of Constructivist Thinking: Constructivism vs. Constructionism

"constructivist" theories of Jean Piaget, asserting that knowledge is not simply transmitted from teacher to student, but actively constructed by the mind of the learner.

"constructionism" suggests that learners are particularly likely to make new ideas when they are actively engaged in making some type of external artifact--be it a robot, a poem, a sand castle, or a computer program--which they can reflect upon and share with others. Thus, constructionism involves two intertwined types of construction: the construction of knowledge in the context of building personally meaningful artifacts.
--Yasmin B. Kafai and Mitchel Resnick, Introduction, Constructionism in Practice, 1996

Quotations from Experts (in Handout)
Dewey Learning via applied practice Vygotsky Learning is socially constructed
Piaget Construction of understanding Polanyi Tacit knowledge
Papert Constructionism

Instructor-centered learning
Hierarchical relationships Instructors as experts
Structured environments Students have little or no knowledge

Student-centered learning
Networking relationships Learners & mentors
Informal environments Students come with their own knowledge and experiences

Shifts in Competencies Classroom
Activity: Didactic to Interactive
Teacher Role: Fact Teller to Collaborator
Student Role: Listener to Collaborator
Instruction: Memorization to Inquiry & Invention
Knowledge: Accumulation to Transformation
Success: Quantity to Quality of understanding
Assessment: Norm to Criterion-referenced
Technology: Drill-and-Practice to Collaboration, Information access, Expression

Sharing Elements from our Teaching Experiences
Getting Class Started Assessment
Project Management Communication Tools
Instructional Enhancement

Getting Class Started
Peter
- One-on one hands-on quiz (see handout)
- Joint Syllabus construction
- "Real-world" profile of technology use in music profession

Dave
- First-day syllabus quiz
- Late Pass ("Plagiarism pass")

Project Management
Peter
- Mini-projects (see handout)
- Service-oriented final project ideas (see handout)
- Project construction with instructor
- Group work
- Long-term projects beyond course time constraints

Dave
- Good-faith efforts
- Real-world project models

Assessment
Peter
- Blackboard Gradebook
- Mid-course evaluation

Dave
- Rubrics for evaluation (see handout)
- Practice e- Final WebCT tests
- In-class skills tests
- WebCT Gradebook

Communication Tools
Peter (Blackboard) and Dave (WebCT) E-Submission of assignments
Discussion Forums All class handouts posted electronically
Contribute links from the Web
E-mails through course management tools

Instructional Enhancement
Dave
- e-Presenters
- Self analysis of learning strategies for software
- Remote desktop control in lab

Peter
- Student as instructor
- Group work

Common Threads
Depend on electronic delivery: materials and communication
Project-oriented course design
Real-world models
Provide varied and rich experiences
Encourage student feedback
Structure learning in small steps

Uncommon Threads
Dave counts points; Peter massages letter grades Peter talks more than Dave
Dave is stricter than Peter

What Has Not Worked
Dave
- Same-paced walk throughs
- Cross-platform issues
- Getting them to read documentation

Peter
- Dealing with individual differences
- Unclear on effectiveness of subjective assessment
- Integrating practical with theoretical

ONLINE HANDOUTS:

Notation Rubric : This is an example of the rubrics that Dave creates for grading class projects. The rubric is given to the students at the time the project is assigned. The sample rubric is one created for evaluation notation projects from Sibelius in his Computer Music Notation class (Music 353).

Hands-on Quiz: This is an example of a learning activity that Peter uses for helping students learn basic operating system skills for his classes. This example also teaches the students cross-platform skills.

II. Case Against Constructivism

From: http://hagar.up.ac.za/catts/learner/2000/scheepers_md/projects/lso/theory/construct.html

1. Use unsuccessful metaphors to explain learning, e.g. human brain works like a computer
2. Different vocabulary mask similar theory
3. Theorists' verbal behavior is accepted without analysis
4. Very subjective
5. Assessment of learner's grasp of material is very difficult
6. Needs a very good infrastructure with many information sources/references e.g. books, software programs, internet access, laboratories (very expensive).
7. Learner must have a level of maturity: (If learner does not take responsibility for learning/ have weak self management skills, system fails)
8. Unpredictable: Incidental learning, outcomes are vague
9. Time consuming
10. Human resource intensive
11. Difficult to develop problems that will motivate all learners to participate in learning process
12. Information overload may intimidate and disorientate novice learners
13. Learners have difficulty in assessing which facts are important and relative
14. In a situation where conformity is essential, divergent thinking and action can cause problems
15. Intellectual anarchy: inference that each person constructs a unique reality, that is only in the mind of the knower

III. Quotations from Experts

"Knowing consists of operations that give experienced objects a form in which the relations, upon which the onward course of events depends, are securely experienced"

--Dewey, *The Quest for Certainty* , p. 235

"From the empiricist point of view, a 'discovery' is new for the person who makes it, but what is discovered was already in existence in external reality and there is therefore no construction of new realities… By contrast, for the genetic epistemologist, knowledge results from continuous construction. Since in each act of understanding, some degree of invention is involved; in development, the passage from one stage to the next is always characterized by the formation of new structures which did not exist before, either in the external world or in the subject's mind." —Piaget, *Genetic Epistemology* , 1970

"…any function in the child's cultural development appears twice, or on two planes. First, it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category."
—Vygotsky, "The Concept of Activity in Soviet Psychology (ed. Wertsch,) p. 163

"To hold such knowledge is an act deeply committed to the conviction that there is something there to be discovered. It is personal, in the sense of involving the personality of him who holds it, and also in the sense of being, as a rule, solitary; but there is no trace in it of self-indulgence. The discoverer is filled with a compelling sense of responsibility for the pursuit of a hidden truth, which demands his services for revealing it. His act of knowing exercises a personal judgement in relating evidence to an external reality, an aspect of which he is seeking to apprehend."

--Polanyi, *Knowing and Being* , 1969

"Constructionism shares constructivism's connotation of learning as 'building knowledge structures' irrespective of the circumstances of the learning. It then adds that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sandcastle on the beach or a theory of the universe…If one eschews pipeline models of transmitting knowledge in talking among ourselves as well as in theorizing about classrooms, then one must expect that I will not be able to tell you about my idea of constructionism. Doing so is bound to trivialize it. Instead, I must confine myself to engage you in experiences (including verbal ones) leading to encourage your own personal construction of something in some sense like it. Only in this way will there be something rich enough in your mind to be worth talking about."

--Papert, *Constructionism, Research Reports and Essays* , 1985-1990 (1991)

IV. Selected Innovations for Teaching Music Technology from the Underware Survey
(collected prior to presentation)

1 I spend very little time lecturing; instead my time is spent facilitating the students' creative work with music technology. I don't focus much at all on teacher uses of technology that reinforce behaviorist or didactic approaches. Instead, all of my classes are spent teaching music students and future and in-service teachers how to facilitate their students' creative work with music technologies through engaging them with creative composing experiences. I draw upon social constructivist approaches to teaching these classes, which when compared to common approaches to teaching music technology in colleges might be seen as innovative.

2 Module on Computer-Assisted Instruction is entirely web-based, with students evaluating a list of online CAI sites that I supply as well as finding two of their own to evaluate.

3 Our MSMT program is online as well as on campus. There is a cohort effect among online learners who naturally seek ongoing contact between online and on campus class members. They conduct dialogues through a chatroom on class material while the instructor is conducting class (often filling in the blanks on things individual class members do not know. The use of music technology, particularly for multimedia production and education brings out the creative and distinctive capabilities of individual students in ways that the traditional classroom lecture, ppt presentation, and class discussion does not. Classes become far more dynamic, while still focused on subject matter.

4 Not really on the "cutting edge" of innovation, but I have found this to be a "highly" successful technique: During the course of the quarter, students are required to complete 6-8 small projects that are purposely designed so that, in order to be completed, students must acquire skills that constitute objectives for the course. The small projects are also designed in a manner that allows them to be used, if appropriate, as a module in the student's final project ... effectively killing two virtual "birds" with one technological "stone." Since incorporating this approach, quality of the Final Project submissions has improved exponentially.

5 Students do "record rips" both as a way to improve their ears and to understand how popular music is written and produced.

6 I think perhaps one innovative approach I use with students is to give them an assignment initially and let them find the answers on their own, rather than lecturing and demonstrating up front, which assumes they don't know anything. Once they have problems, and generally they all get to the same problems around the same time, I give a brief demonstration to all of them. However, often times they help each other and I monitor what is happening in the room, and/or work with individual students as needed.

7 I have a link from our class page to work by students from previous semesters. I find this encourages and challenges the students to rise to the level of their peers (or in many cases try to surpass them). It also keeps them from doing the same unit over and over. Some of my interns and new teachers say they refer to and use these in classes.

8 With only a 20 hour class, it is difficult to get past the basics, but I do allow an open-ended final project where students and I decide the final project design. It can either be an extension and combination of one of the earlier projects, e.g.: Create a full score of a short piece with accompaniment CD's and a short WebQuest for students to learn about the ComposerStyle. Or, it can be a new topic of interest to that student, e.g.: A student is interested in learning Final Cut Express or Garage Band.

9 I base the whole class on a curriculum integration project that students must design to integrate technology into their current or likely teaching job. They must prepare a proposal that gives a rationale for the benefits of the project, identifies student learning outcomes, identifies the software needed to help students reach learning outcomes and develop lesson plans and software materials needed to teach the plans. They must present all of this as a presentation to the class and receive collegial critiques of it. This keeps the class centered on music learning , not on technical considerations

10 We tie one of the concert series events to music technology, and focus on the type of usage that is made by the visiting artists. This year we have Pamela Z, working with loops, delays, and alternative controllers (the Body Synth). The point is to link serious musical performance to the geeky stuff.

11 Students develop an electronic portfolio of class work based on the ISTE:NETS-T standards. I've had guest lecturers via iChat by experts such as Peter Webster and Sam Reese. This winter I'm toying with the idea of having the entire class work together to develop a podcast. The topic of the podcast would be our state music education conference (possibly a "soundseeing tour" of the conference). This project would not only be a way of acquainting students with some of the potentials of this technology, but could also serve as a hands-on project for learning about digital audio software, hardware, and associated processes. An added benefit might be that our state music education association could post the podcast on its website for teachers who were unable to attend the conference, etc.

12 Students in my classes participate in a variety of collaborative activities with students in other departments [e.g. animation (CS), digital media (ART), songwriting (English)]

13 Creating one element of a project in Garage Band, import that into Digital Performer to create another element, import that into Finale to print out a score, .

14 Students are required to create lesson plans and supportive materials for each major area of music technology. They use the www.ti-me.org online lesson plan creator (members section - lesson plans). Students are encouraged to submit these lesson plans to the site so other TI:ME members can view and download them.

V. General Websites on Constructivism in an Educational Context

http://www.sedl.org/pubs/sedletter/v09n03/construct.html

Excellent summary of constructivist thinking from the SEDLetter published by the Southwest Educational Development Laboratory.

http://carbon.cudenver.edu/~smryder/itc_data/constructivism.html

This site at the University of Colorado contains a useful list of important references for the topic. There are also links to scholars with different views on constructivism.

http://www.cc.gatech.edu/edutech/LBD/constructivism.html

More on issues of definition.

http://www.coe.uga.edu/epltt/LearningbyDesign.htm

Gateway to an extensive e-book on constructivism learning and application by S. Han & K. Bhattacharya.

http://www.papert.org/articles/SituatingConstructionism.html

First chapter of Papert and Harel's book called *Constructionism* (Ablex Publishing Corporation, 1991).

VI. Websites and other Sources on Constructivism, Technology, and Music Technology

http://itech1.coe.uga.edu/itforum/paper1/paper1.html

Paper by David H. Jonassen at Pennsylvania State University on the use of computers as resources for a constructivist approach.

http://music.utsa.edu/shtml/conf-V/V-HickeyV-Hickey.html

Paper by Professor Maud Hickey at Northwestern on "Exploring Music Collaboration over the Internet"

http://pubweb.northwestern.edu/~webster/writings/Hand2tech.html

The draft of Peter Webster's chapter for the Handbook of Research on Music Teaching and Learning, 2nd Edition, on what we know from the research about the effectiveness of music technology.

Buehrer, T. (2000). *An alternative pedagogical paradigm for aural skills: An examination of constructivist learning theory and its potential for implementation into aural skills curricula. Dissertation Abstracts International, 61 (04), 1210. (University Microfilms No. AAT 9966041).*
Interesting dissertation on the application of constructivist thinking to aural skills/music theory courses on the college level.

Lord, C. H. (1993). Harnessing technology to open the mind: Beyond drill and practice for aural skills. *Journal of Music Theory Pedagogy, 7* , 105-117.

Kafai, Y., & Resnick, M. (Eds.). (1996). *Constructionism in practice: designing, thinking, and learning in a digital world* . Mahwah, NJ: Lawrence Erlbaum. See also: http://www.gseis.ucla.edu/faculty/kafai/faculty/Book_CIP_Intro.html

Williams, D. & Webster, P. (2006) *Experiencing Music Technology, Third Edition* . New York: Thomson/Schirmer. See also: http://www.emtbook.net/