Forum 9 (Constructivism and Metacognition) Response

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IST 520: Theories of Learning and Instruction
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Introduction: I chose to address Prompt #1, applying the principles of constructivism in a preliminary analysis of my capstone project. As much of the capstone work at this time is theoretical, the 5P analysis is based upon plans and assumptions about the final product. I used this exercise to brainstorm how constructivist principles might be implemented within the framework of this course on safe and effective vinyl cutter use.

Part (a) response: Learning-by-doing and group work are essential elements of a constructivist approach. A constructivist curriculum is not necessarily designed to build towards a specific planned outcome. The teacher is placed in the role of "guide on the side," supporting learners in constructing their own models or schemata. From a Vygotskian social constructivism standpoint, this world view construction is inextricably connected to social interaction. Knowledge is a function of culture, "constructed and negotiated socially" (Harasim, 2017, p. 61). Piaget's cognitive constructivism champions the essential role of active participation, allowing students to organize and adapt new information into existing concepts (Harasim, 2017).

Part (b) response introduction: As the goal of this "Level 1" safety training is to prepare learners to use the Innovation Lab's vinyl cutter safely and effectively according to standards that do not allow deviation, the subjectivist tenets of constructivism (in which learners are supported in coming to their own conclusions) do not support the overall objectivist framework. However, the larger goal of the course is to prepare learners to apply these tools (safely and effectively) within complex creative problem-solving scenarios, a distinctly constructivist task. In fact, the guiding instructional theory of the Innovation Lab is liberatory design, which challenges its adherents to tackle problems empathetically via six nonlinear steps: empathize, define, inquire, imagine, prototype, and try (Monterey Bay Aquarium, 2022; National Equity Project, n.d.). Practitioners of liberatory design are called upon to see problems, engage with key stakeholders, and take actions from which they will learn (National Equity Project, n.d.).

Bearing this overarching goal in mind, I intend to integrate thought challenges that provoke creative individual assessment of how this tool might be used to benefit society, in alignment with Vygotsky's social constructivism. Examples of constructivist vinyl cutter production will be provided as inspiration for new learners.

Vygotsky's emphasis on tools within the context of culture is of particular interest in relation to this capstone work. As Harasim (2017) states, Vygotsky defined social development as "internalization of the tools of the culture" (p. 68). These tools serve to support engagement with the group.

5P Guidelines/Rubric © for Assessing Provision of
Individual and Collaborative Learning Elements in a Learning Activity
Mapping Cognitive Science Against Learning Approaches
Analysis of Monterey Bay Aquarium Innovation Lab Vinyl Cutter Safe and Effective Use Course (from a constructivist perspective)
(Amanda Philbrick preliminary capstone analysis)

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Element of Motivation	Accounted For? Y = Yes N= No NA = Not Applicable ? = Cannot Determine	Comments
Presentation		
Material appears relevant to the needs and goals of the learner	Relevance	At the course's outset, course objectives will be outlined. These procedural and declarative objectives regarding safe and effective vinyl cutter use (e.g., acquiring knowledge of vinyl cutter part purposes, how to load vinyl into the cutter, etc.) are notably not constructivist in nature. Objective safety and correct use outcomes will be facilitated via behavioral and cognitive learning theory tenets. However, to address the critical aspect of relevance, constructivist learning theory elements will be integrated. The learner will be presented with examples of how vinyl cutter use has benefitted previous learners (integrating a cultural element in alignment with

		Vygotskian social constructivism). The learner will then be challenged to reflect on their previous experiences with creation (clay modeling, Lego construction, illustration, creative writing, storytelling, sandcastle construction, etc.) and be challenged to consider what products they might make with the vinyl cutter (once they have attained appropriate certification via this course). As David Jonassen asserts, a defining characteristic of a constructivist learning environment is facilitation of reflection (Harasim, 2017).
Material and/or presentation/stimulus is novel, should appear to be something new and interesting to the learner	Novel Pleasantness	While the content of a safety course could be perceived as dry, and will by necessity retain an appropriate professional tone, interest in the subject matter will be elicited by presenting the novel capacities of the vinyl cutter. I anticipate that many learners may be unfamiliar with the vinyl cutter. The course's introduction will explain what students can accomplish with this unique tool. An essential element of Piaget's cognitive constructivism is the development of symbolic

		thought (Mcleoad, 2023). Vinyl cutter production can provide a novel way to represent and communicate ideas symbolically. Leaners will be guided to consider this possible use for the vinyl cutter. Even for learners familiar with vinyl cutter use, the constructivist approach to creative representation might be novel. Minimally, novel symbol creation might be facilitated.
Presentation approach is intrinsically pleasant/interesting/stimulating/ thought provoking	Novel Pleasantness	The media for this course will include multiple audiovisual products that provide concise instruction. These materials will be scripted, storyboarded, and carefully shot with an eye towards pleasant presentation. It is hoped that this pleasant presentation will support the intrinsic motivation of leaners to engage with all elements of the course, be those elements based upon behaviorist, cognitivist, or constructivist principles. Hands-on support from experts in the lab will also serve to facilitate a stimulating and interesting experience.
Wording, visuals, audio, language are manageable and usable to the receiving group or individual creating the impression that the	Coping	As my audience is 11- to 65-year-old learners, it could be assumed that many participants will have reached Piaget's formal

group or individual can master the material to the extent desired.		operational stage of cognitive development. At this stage, learners are capable of hypothetical thinking and logical reasoning (Mcleod, 2013). It is relevant to note, however, that not all learners are believed to reach this final stage; critics of Piaget have asserted that only one third of adults achieve formal operational thinking (Mcleod, 2013). Given this assertion, it might be appropriate to speak to a concrete operations level of development: hands-on problem solving with actual objects (which is the end goal of this training). The Plowden report, produced in the UK in the 1960s by educators seeking to implement tenets of Piaget's cognitive constructivism within primary education, emphasized the importance of readiness for learning (Mcleod, 2013). A flexible curriculum that allows adjustment to the individual readiness of each learner is one of the key recommendations this report provided. While not all learners may be at a formal operational level of development that allows for abstract thought, it might be appropriate to integrate thought-provoking scenarios and

		examples that will speak to learners capable of abstract thought. These elements will be integrated subtly so as not to distract those learners who may primarily perceive the world from a concrete operations developmental level (if assuming a Piagetian view of cognitive development). To effectively meet learners where they are, I will confirm with my SME the appropriate reading level at which materials ought to be written. Support will be provided throughout the course. Knowledge check questions will be presented as learning opportunities, rather than punitive exercises. Learners will be encouraged at multiple junctures to reach out to experts available in the Innovation Lab for support. The final stage of the course entails one-on-one instruction and sign-off with an expert. All these elements will support the learner's coping.
Does the learning approach appear to provide for the elements of presentation? If not, why not?		The content of this "Level 1" safety course do not require presentation of products. However, the goal is to prepare learners to produce vinyl cutter products that they might subsequently present. This presentation would align

		with Vygotsky's social constructivism, in which social interaction informs learning (Mcleod, 2023). The presentation of products to peers is an inherently social activity. Students will be challenged to consider what products they might create and be encouraged to share these creations if they feel comfortable doing so.
Practice		
Opportunities are provided to develop proficiency in application of the skill, knowledge, ability or concept	Coping Self and Social Status	This safety course's objectives are both declarative and procedural. Procedural objective attainment will be facilitated and confirmed via hands-on practice. Adherence to specific and unmodifiable safety standards is required, so while participants will be actively "learning by doing," the prescriptive nature of this active participation renders the hands-on activity behavioral and cognitivist in nature. However, once students certify for "safe use with supervision" of the vinyl cutter via this "Level 1" safety course, they will be empowered and encouraged to creatively consider how they might individually and socially create products with the vinyl cutter.

Practice opportunities appropriate to the objective(s) are provided	Coping	Practice opportunities will be carefully aligned with course objectives. An example procedural objective is, “Given access to the GS-24 User’s Manual, Innovation Lab participants will be able to import sample data into CutStudio software without receiving an ‘error’ notification.” As with all the procedural objectives, learners will be supported in physically performing and practicing this task. “Safe and effective use” tasks, while providing the foundation for constructivist self-directed production, will be prescriptive, in alignment with objectivist learning theory tenets.
Practice activities, to include repetition and spiraling, are designed to develop automaticity in responses and execution if appropriate	Coping	Repetition of tasks until understanding is achieved will be encouraged. Attaining “Level 1” certification via this course prepares learners to use the vinyl cutter with supervision. After course completion, participants will be supported in continuing to use the vinyl cutter to reinforce what was learned in “Level 1” certification. Repetitious application of objectivist safety and effective use standards will support learners in reaching

		the higher badge levels. If attained, these upper badge levels allow independent vinyl cutter use, and even supervision of other participants.
Practice is relevant to needs and goals of the learner	Coping Relevance	The course's introduction will make the goals of course completion clear. Goals of the course not only include the ability to safely use the vinyl cutter with supervision, but ultimately the ability to creatively build products with the vinyl cutter individually and socially. As instruction is provided, skills will be demonstrated within the context of specific examples. This will serve to remind the learner of the relevance of coursework for their individual goals.
Activities are such that the Learner can see that skill/competency acquisition is taking place	Coping Relevance Self and Social Status Pleasantness	Hands-on practice with the vinyl cutter will effectively demonstrate to the learner the physical implications of acquired knowledge.
Practice requirements are within or slightly above learner's competency level	Coping Pleasantness	A key concept of Vygotsky's social constructivism is the zone of proximal development. The zone of proximal development is a space in which scaffolded support for skills just outside of the learner's reach is provided (Harasim, 2017).

		Because this is a regulatory safety course, regardless of familiarity or previous experience, all participants will be required to complete the training. Thus, the training will aim to speak to learners with the lowest knowledge level. The course will, however, be self-paced. This will allow those learners that require more time to review the ability to capitalize on this opportunity. Participants with confidence around the tool will be able to navigate more swiftly through the course.
Learners can perform practice requirements.	Coping Pleasantness Self and Social Status	Learners will be provided with ample support to facilitate coping. It is anticipated that most Innovation Lab participants will complete the online training in-person, allowing instructor input to be easily provided. All learners, including those that complete the online portion asynchronously, will present in-person for the final portion of the course. This hands-on final activity will allow every participant to receive individualized aid as needed.
Practice is designed to lead to the desired outcome.	Coping Relevance	Identification of course objectives prior to course creation will ensure that practice activities align with those objectives.

		For example, one of the proposed objectives is, "Given access to the Thinkific vinyl cutter course instructions, Innovation Lab participants will be able to create a vinyl cut design in Adobe Illustrator that is compatible with the GS-24 vinyl cutter." With this objective in mind, students will be guided to practice identifying vinyl cutter templates and importing them to Adobe Illustrator (or vectorizing images to make them compatible with the vinyl cutter format within Adobe Illustator). Specific steps in the context of examples will be provided. Students will be guided to complete these steps themselves.
Practice activities, while not necessarily pleasant, would likely generate a feeling of accomplishment.	Coping Self and Social Status	The course culminates in hands-on vinyl cutter use with the support of a guide. Learners will thus be able to experience the feeling of accomplishment that accompanies creation. To accommodate different learner levels, participants may either follow specific example instructions, or they can independently design and cut products. The course will thus integrate constructivist

		tenets as appropriate for the learner's individual zone of proximal development.
Does the learning approach provide for practice? If not, why not?		Physical practice of procedural activities (e.g., Adobe Illustrator vinyl cut design, loading of appropriate material, directing the vinyl cutter to cut, etc.) is an essential component of this course. Learners will only be able to attain a "Level 1" badge by way of physical hands-on practice. This practice will be guided by behavioral and cognitive learning theory tenets. Individualized direction will be encouraged via constructivist learning theory principles.
Production and Posting		
What is produced is informed and scaffolded by practice—may even be concurrent with practice, i.e., repetitive practice may not be part of the learning task such as writing a paper, but the writing is both practice and production at the same time.	Coping	Learners that complete the course will have successfully directed the creation of a vinyl cutter product. Typically, this will be accomplished via a template, but learners already familiar with vinyl cutter design might construct and produce their own design. All learners, throughout and upon completion of the course, will be encouraged to design creatively, in alignment with the Innovation Lab's liberatory

		design tenets (Monterey Bay Aquarium, 2022). Practice and production are inextricably connected in this vinyl cutter course.
Opportunity is provided to apply the skill, knowledge/ability or concept being learned	Relevance Self and social status Coping	Attainment of the "Level 1" badge provides learners with certification to use the vinyl cutter with supervision. The course integrates practice of the skills necessary to use the vinyl cutter in this context. Learners will be encouraged to continue to apply the skills gained after course completion.
Production reinforces practice activities	Coping	A truly constructivist learning environment supports learners within their individual zone of proximal development as students collaboratively and actively learn by doing (Harasim, 2017). As opposed to transmitting data, a constructivist instructor presents students with techniques, collaboratively scaffolding their understanding of *how* to tackle a problem. This hands-on work will typically result in physical production (Harasim, 2017). Practice and production are intimately and inextricably connected in this course.

		In practicing the skill of crafting a vinyl cutter design and instructing the vinyl cutter to make it, production follows practice. Students will be shown how to make products and will then be encouraged to take on problems via physical production of the products they now know how to create.
Whatever is produced by the learner is posted or provided to group for peer view and learning	Coping Self and Social Status (Accountability)	The opportunity to publicly share products will be provided, but not required. Vygotsky's social constructivism emphasizes collaborative learning, supporting "the sharing of alternative viewpoints and challenging or developing each alternative point of view" (Harasim, 2017, p. 73). At the conclusion of the course, students will be provided with inspirational examples of products (implementing social constructivism for those learners that made those products previously) to encourage these newly certified individuals to also engage in a socially constructivist fashion.
Does the approach require production or evidence of skill, knowledge, ability or concept acquisition? If not, why not?	Coping Relevance Self and social status	Yes, the course culminates in creation of a vinyl cutter product via prescriptive steps.

		Safe and correct steps will be presented to learners behaviorally and cognitively, ensuring adherence to regulations. Learners will be encouraged to creatively apply learned skills to constructively create products that solve problems in alignment with the liberatory design philosophy of the Innovation Lab (Monterey Bay Aquarium, 2022).
Participation/Collaboration		
There is opportunity for synchronous or asynchronous review of posted products	Self and Social Status Relevance Coping	While posting of products is not a required element of the course, the opportunity to do so will be provided. If possible, example products from previous students will be included within the context of the course, providing the opportunity for asynchronous review. While in the Innovation Lab, students will be encouraged to explore products produced by the vinyl cutter and will be instructed on how to share their own work, either synchronously in the Innovation Lab or asynchronously via the Monterey Bay Aquarium's (MBA) Instagram profile.

		The final section (and perhaps the initial section) of the vinyl cutter course might include a link to the MBA's profile to facilitate viewing of previous student production.
Teacher and peer feedback promote a Community of Practice/Wisdom/Knowledge	Self and Social Status Coping Relevance	The last section of this course entails a one-on-one skill sign-off with an expert in the Innovation Lab. This final interaction facilitates teacher feedback, promoting communication and wisdom sharing. Within the Innovation Lab, students will be able to work either individually or collaboratively. The opportunity to share final products will facilitate peer interaction and feedback, in alignment with social constructivism tenets. The learning accomplished via the group will lead to individual and community development (Harasim, 2017).
Teacher and cohort can see who is contributing and how they are contributing to knowledge sharing	Self and Social Status and Accountability	Completion of this vinyl cutter course is not a requirement. Innovation Lab participants self-identify which tools for which they desire to obtain certification. Students may be motivated by the intrinsically social environment of the Innovation Lab to create products for sharing, but contribution via production is not mandated.

Variation in task readiness and ability to contribute is dealt with by providing group activities and effort to meet goals	Self and Social Status Coping	The opportunity to work with peers on projects will be provided, but not necessarily required, within the Innovation Lab. Depending upon the specific group and the instructor goals, students might be encouraged to work individually or in small groups/pairs. Flexibility will be essential given the variety of learner backgrounds, readiness levels, and experience.
Virtual opportunities to meet and collaborate are provided for if face to face meetings are not feasible and the instruction is online or blended	Self and Social Status Coping Relevance Pleasantness	The online portions of the course will allow learners to complete the initial sections either synchronously or asynchronously (though, at this time, it is planned for most learners to complete all portions in-person). The final section of the course requires in-person interaction, allowing individualized feedback to be provided by experts. Online learning is seen as highly compatible with constructivist tenets, providing students with the opportunity to readily access data, communicate and collaborate across space, encounter challenges, and reflect on learning experiences via discussion boards or online portfolios (Harasim, 2017). This course's integration of

		online learning provides the possibility for constructivist principles implementation. It is possible that an online discussion/sharing forum might be integrated into the course based upon SME feedback.
Does the learning approach provide for collaboration? If not, why not?		The physical layout of the Innovation Lab is an open floorplan, facilitating group interaction. Depending upon the class structure, collaboration might be consciously facilitated by instructors, or it might grow naturally out of individual self-direction and communication between peers. Given the variety of types of learners, the degree to which collaboration takes place will vary.

References

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