

CONSTRUCTIVIST PEDAGOGY IN THE AGE OF COVID-19: LESSONS FROM A TEACHER EDUCATOR'S PERSPECTIVE

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ABSTRACT

Formal education as we knew it came to an abrupt halt occasioned by the deadly COVID-19 pandemic. The deadly coronavirus rendered it unsafe to gather for educational activities. Consequently, a retreat to the “safety” of our homes was required to continue this important pursuit through remote modalities. The teacher-centered pedagogical approach that is widely practiced, and that learners are conditioned to appreciate, is not consistent with the paradigm-shift in learning that was required during the pandemic or any event that necessitates a switch to online learning. This paper focuses on how constructivism could serve as a valuable pedagogical approach in a situation such as we have experienced during the pandemic. In particular, the paper: (1) explicates how constructivist pedagogy is consistent with the online learning environment; and (2) offers practical strategies and examples developed from the teacher education perspective that could have relevance for future disruptions.

Introduction and Background

The Rise Of Covid-19

The COVID-19 pandemic swept across the globe rapidly and altered life as we knew it. According to the World Health Organization (WHO, 2020), on December 31, 2019, the Wuhan Municipal Health Commission in China reported a cluster of pneumonia cases in Wuhan, Hubei Province. On January 9, 2020, the WHO reported that the Chinese government determined that the outbreak was caused by a novel coronavirus. On January 11, the organization stated that the Chinese media reported the first death from the virus. Soon after there were cases identified in Thailand. On February 11, the WHO announced that the disease caused by the novel coronavirus would be named COVID-19. In little time thereafter, there were reports of the virus spreading rapidly across the globe, hence becoming a pandemic. The United States reported its first death on February 29 which was later refuted to have actually been on February 6 (Romero, 2020). Soon after, there were numerous cases of infection and the death count mounted rapidly in the country. By the end of March 2020 there were over 4000 deaths reported in the United States (*The Atlantic*, 2021). Upon the writing of this article, there were over 533.7 million confirmed cases and over 6.3 million deaths worldwide; and in the US, over 85.1 million cases, and over 1 million deaths (Johns Hopkins University, 2022).

Immediate Impact Of COVID-19 On Educational Institutions

It became exceedingly clear that COVID-19 was a dangerous virus, and with no available vaccine, evasive or mitigating actions were promptly required. It was also concluded by the medical authorities that the virus was transmitted primarily through inhaling the air from an infected individual, therefore the logical immediate recommendation, among others, was to suspend face-to-face contact at all educational institutions and switch to online instruction. Indeed, this was a challenging proposition for educators not only because of the sudden pivot midstream the semester or term, but because remote teaching was not the practice of the vast majority of professors and k-12 teachers. As would be imagined, the situation was also compounded by the fact that students and parents not only experienced challenges accessing the requisite technology (a critical issue beyond the scope of this paper), but in general were not accustomed to the online learning environment. Notwithstanding, educators and students needed to engage with at least some version of remote learning for the foreseeable future. That reality required an approach to teaching that could effectively support virtual learning. As a teacher educator versed in online instruction as well as constructivist pedagogy, I would like to use this paper to share some strategies and insights that others might find useful at the higher education level.

The Prevailing Instructional Approach And Corresponding Learning Orientation

The instructional methodology that has been unremittingly popular among educators is the teacher-centered approach, primarily executed through the conventional lecture method. Although there is an abundance of evidence that lecturing is ineffective for deeper learning compared to active pedagogical methods (Freeman et al., 2014; Hake, 1998; Hansen & Stephens, 2000; Machemer & Crawford, 2007; Phipps, Phipps, Kask, & Higgins, 2001), it remains the primary mode of instruction among professors. A recent study that examined 2008 classes in 709 courses taught by 548 instructors across 24 doctorate-granting and undergraduate

institutions, found that 74.9% were lecture-based (Stains et al., 2018). The preference for lecturing among many professors may be attributed to the challenges they experience transitioning students from being dependent to more active, independent learners (Felder & Brent, 1996; Goodnough & Cashion, 2006; Mezeske, 2004). Also, because teaching evaluations are a significant component of professors' tenure and promotion, students' perceptions that lectures are effective (Covill, 2011; Deslauriers et al., 2019; Lake, 2001; Leeds, Stull, & Westbrook, 1998; McKeachie, 1997) often drive the educators' instructional choice (Kolitch & Dean, 1999).

Research has shown too, that the penchant for lecturing is also strongly evident among students. There seems to be a consistent belief among many students that they learn more from lectures compared to active learning methods (Covill, 2011; Deslauriers et al., 2019; Lake, 2001; Leeds, Stull, & Westbrook, 1998). Students who prefer this mode of instruction indicate that it "enables them to listen passively," "organizes the subject matter for them," and "prepares them well for tests" (McKeachie, 1997, p. 1219). Such findings indicate the conception of a particular consumeristic or transactional attitude among some students regarding learning. For example, when required to be more actively engaged and accountable for their own learning, some students take the stance that they are paying tuition to be taught, and not responsible for teaching themselves (Felder & Brent, 1996). Although the preference for lecture can be partly attributed to students' attitude and perceptions (Elen & Lowyck, 2000; Entwistle & Tait, 1990) about learning, it may also be dependent on the nature of the lecture. In one study that utilized *PollEverywhere Audience Response System (ARS)*, which provided an interactive component to the learning experience, students had high praises for lecturing. Students reported that it increased their participation, clarified their thinking, helped them to focus on key points, and increased their motivation to learn (Meguid & Collins, 2017). The findings in that study demonstrate the value of interactive learning where learners are not just passive recipients of information. Research also indicates that first-years and sophomores are more likely to prefer lectures than juniors and seniors (Lake, 2001; Lammers & Smith, 2008), suggesting the role of intellectual maturity in the choice for instructional and learning modalities.

Instructional And Learning Shift Necessary For Virtual School Environment

A major concern about lecturing is that it is not an effective approach to foster independent learning (Daniel, 2016; Machemer & Crawford, 2007). Although lectures are useful for certain purposes, for example delivering information to large groups or explaining complex concepts (French & Kennedy, 2017), that usefulness is largely reliant on the instructor being physically in the room with students. For online teaching, that prospect is only virtually possible. And although computer technology can facilitate the virtual presence of the instructor, students will need to work much more independently than in the in-person format. This also means that it is incumbent upon instructors to teach in a manner consistent with students' new learning needs created by the pandemic environment.

Independent learning, also referred to as "self-regulated learning," "self-directed learning", or "learning how to learn" (Meyer, 2008, p. 2) is particularly critical for academic success when face-to-face interaction between students and instructor is minimal or non-existent. This approach to learning requires students to develop an understanding of their own learning strategies, motivation to take responsibility for their learning, and the ability to work with others to increase the depth and breadth of their learning (Zimmerman, 1986). Meyer, et al. (2008) found that independent learners "develop the values, attitudes, knowledge and skills needed to make responsible decisions and take appropriate actions in regard to their own learning" (p.15). It is understandable that perhaps most students will not be able to get to this independent place on their own. Therefore, instructors would need to take the responsibility to support students to make that shift (Deslauriers et al., 2019; Field, 2015) or transition. This means significant reorienting of curricular methods and materials, which includes educating students about the value of active and independent learning (Deslauriers et al., 2019; Field et al., 2015), as well as providing them with significant guidance and structure (Mayer, 2004; Kirschner et al., 2006). The constructivist pedagogical framework provides instructors with these possibilities.

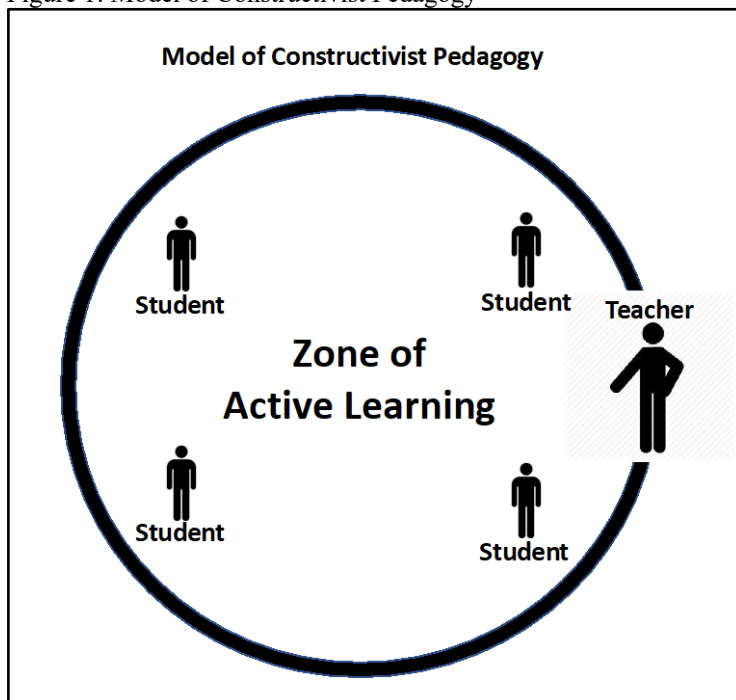
Constructivist Pedagogy

Pedagogical practices are informed by learning theories. Behaviorism, cognitivism, and constructivism are three major pedagogical frameworks that continue to inform teaching practices. However, some features of behaviorism and cognitivism are likely to promote student disempowerment. Behaviorism is based on the thinking that learning involves manipulating, measuring, and changing behavior (See the work of theorists such as J. B. Watson, I. P. Pavlov, B. F. Skinner, and E. L. Thorndike). Cognitivism is grounded in the work of scholars such as Piaget, Vygotsky, Bruner, and Asubel and focuses on the workings of the mind, instead of observable behaviors. Essentially, both theories largely treat the learner as a passive recipient of knowledge, hence promoting the "banking" (Freire, 1970) concept of education, which largely encourages lecturing. Conversely, constructivism considers the learner an interactive participant in the process (Dewey, 1938); Vygotsky, 1978), hence valuing the agency that a student potentially brings to the learning experience. No

pedagogical approach is a panacea or without shortcomings, but the constructivist framework perhaps holds a promising prospect for meeting the learning needs required for online education necessitated by an event such as a deadly pandemic.

The constructivist theory of learning is rooted in the work of education theorists such as Piaget (experiential learning); Dewey (democracy, hands-on learning); Maria Montessori (learner-centered classroom); Bruner (learning as an active process); and Vygotsky (Social learning). Essentially, constructivism advances the perspective that people (re)construct meanings for themselves in the process of making sense of their environment. In this conceptualization, learning should focus on providing students with opportunities and support to (re)construct or co-construct knowledge. This model of teaching and learning is aptly captured in Slavin’s (2000) incisive metaphor that “Teachers can give students ladders that lead to higher understanding, [but] the students themselves must climb these ladders” (p.256). Constructivist theory therefore, does not propose that students go off by themselves with *minimal* guidance as some have interpreted (Kirchner et al., 2008), but instead provide the necessary support for successful, meaningful, and abiding learning (Cubukcu, 2009; Field et al., 2015; Zimmerman, 1986). As depicted in Figure 1 (original diagram developed for this paper), students are at the center of this instructional model, while the teacher is located on the outskirts of the zone of active learning, acting more as a “guide by the side”, instead of the traditional “sage on the stage”. It is important to understand that in this model, students are provided the latitude to expand their learning. They are regulated (or guided) however, by the parameters judiciously established by the teacher, who provides directions and the necessary support to meet the instructional objectives informing a particular learning experience.

Figure 1: Model of Constructivist Pedagogy



The central principle and premise of constructivism therefore, is that learners construct meanings for themselves (DeVries, 1997), and are not passive recipients of knowledge. This principle is predicated on the idea that as a species, human beings are constantly constructing knowledge based on our personal experiences and hypotheses about our environment. Put another way, human beings are active organisms inherently oriented towards growth, adaptation, and development (Niemic, et al., 2010). Furthermore, when we discover knowledge through our own efforts, the commitment and motivation involved in the process are more likely to cause us to develop a higher degree of intimacy with, and proprietorship of the knowledge. This metacognitive relationship with knowledge so acquired, enables us to be more effective and confident in applying it later. Constructivism therefore, requires that learning experiences afford students the opportunity to exercise their inalienable agency to uncover knowledge for themselves, instead of being information depositories for the teacher. When students are provided the latitude to exercise personal agency in their own learning, they tend to develop self-efficacy and are less likely to perceive the teacher as the all-knowing authority on whom they must depend for knowledge. This is the kind of mindset that is likely to produce greater academic success, when learning largely takes place through an online modality.

Methodology

As explained earlier, I employ a constructivist approach in my work as a teacher educator. As such, the learning experiences I provide my student teachers require them to be actively engaged, working independently. Although learners might eventually come to understand the value of active learning, it is important to make them aware of such in an effort to reduce frustration later in the learning experiences (Deslauriers et al., 2019; Field et al., 2015). In light of this understanding, I declare to my students from the outset that the course is governed by constructivism. In that conversation, I explain the theory and elaborate on the value of active and independent learning, for their benefit as learners, and their future students. The learning experiences I discuss below demonstrate how I employ principles of constructivist pedagogy to support student teachers' own learning, as well as providing a model for them to consider in their future practice as educators. For this paper, I have selected sample tasks representative of key areas of work in our teacher education program. These are (1) microteaching, (2) field experience, (3) collaborative learning, and (4) using assignment templates. In the discussion below on operationalizing constructivist pedagogy, I provide a description and an explanation of how each task is executed in a related course; then I analyze how each employs principles of constructivist pedagogy to facilitate learning in a virtual or online environment.

Operationalizing Constructivist Pedagogy

Microteaching using Zoom Video Conferencing

One video conferencing technology that has gained popularity during the pandemic is *Zoom* (Zoom Video Communications, 2019). This platform has been used globally by virtually all sectors of society, and has been a staple mode of classroom instruction from kindergarten up to the higher education level. The instructor is able to conduct a class remotely and see the students and vice versa. Although this is not a physical face-to-face classroom interaction, instructor and students still experience real time engagement.

One of the ways that *Zoom* has supported my work as a teacher educator during the pandemic, is to facilitate the micro- (or peer-) teaching assignment required in my curriculum course, EDUC 354 *Educational Planning and Evaluation*. Normally teacher candidates would execute this teaching activity in a face-to-face format. Seizing the “teachable moment” presented by the pandemic, I transferred my microteaching exercise to the *Zoom* platform. Below are the instructions for this assignment:

Sample 1: Microteaching

Instructions: Prepare and teach your peers a 20-minute lesson in your subject area. Imagine that your peers are **middle OR high school students**. You may use the lesson plan from microteaching 1, which you would improve based on the feedback received from your peers and me; or you may design a new lesson if you prefer. The rubric shared and discussed before, will be used to evaluate how you execute your lesson plan for the time allotted. **(20 points; 10% weight)**

As described in Sample 1 above, each teacher candidate is allotted 20 minutes to teach a lesson with their peers participating as students at the grade level of the intended lesson. Each “teacher” conducts the learning experience, engaging students using groupings and other strategies they consider appropriate for supporting their stated learning objectives. At the end of each lesson, each peer provides feedback on the lesson, by stating two strengths and two areas for improvement. They submit this information anonymously through an electronic form that I create in *Google Forms*, following a link I share prior to the lesson. I retrieve this information which is automatically generated in *Google Sheets*, and along with my own observations captured in the rubric, deliver to the respective teacher when I provide the feedback and grade for the performance.

This microteaching activity was transposed to the online mode through the *Zoom* video conferencing technology virtually seamlessly. Each teacher candidate was allotted time to teach, incorporating a combination of strategies and materials. For example, some introduced lessons with mini-lectures; posed questions to the class and receive responses; fielded questions delivered orally or through *Zoom*'s chat feature; and displayed documents (e.g., slides, articles, webpages) through the *Share Screen* feature for the entire class to view. One notable feature in the *Zoom* application is *Breakout Rooms*. The feature allows the teacher to transition from whole class instruction to group activities, and back. Students are able to work collaboratively in small teams, while the teacher circulates to each group to practice providing the necessary clarification, supervision, and support. Aside from the occasional lag in Wi-Fi service some of my students experienced, these microteaching activities went smoothly.

My explanation above illustrates the value of *Zoom* as an impressive alternative to the in-person rendition of the assignment, and how the technology facilitates principles of constructivist pedagogy. In particular, this learning experience provided my students the opportunity to engage in active learning, learn from each other, and nurture

seeds of sustainable or life-long learning. Constructivism facilitates active learning which is demonstrated when my teacher candidates, practiced conducting a lesson incorporating different instructional strategies and materials. For example, introducing lessons using online videos, grouping learners through *Breakout Rooms*, and responding to questions posed by learners orally or through the chat feature, are all valuable active learning experiences for student teachers as they gather insights about teaching. My students also gleaned ideas vicariously as they observed their peers delivering lessons using multiple approaches. In addition, because students are provided the latitude to develop and implement their own ideas in the lessons, they are likely to increase confidence in their own pedagogical efficacy. This opportunity in turn can foster more enduring and life-long learning habits. Although in-person interaction is arguably the ideal situation to develop the principles discussed above, the *Zoom* platform facilitated the accomplishment of my goals for this microteaching learning experience and proved to be a useful alternative in a situation such as that created by a pandemic.

Field Experience

Prepractica are integral components of the teacher preparation process in terms of providing practical experiences for teacher candidates, and fulfill state requirements for our program. Prepractica have been profoundly affected by the pandemic, and my institution is no exception. Pre COVID-19, our students would be placed at physical sites (i.e., schools) to complete prepractica ranging from 15 to 30 hours. During the pandemic, we had little choice but to suspend those activities as we knew them. For this paper I will describe a virtual prepracticum alternative associated with my foundations in education course, *EDUC 220 Schools in American Culture*. This prepracticum is a 15-hour field experience, and the activity described below is part of larger portfolio which serves as a capstone assignment for the course. In addition, this is my students' first or initial field experience.

Sample 2: Classroom Observation

Instructions: In lieu of an actual prepracticum placement, you will review and analyze 15-20-minute video clips that demonstrate various classroom interactions. You are required to observe and reflect on **three** different classrooms. Make sure **two** are at the grade level you intend to obtain your certification, and at least one of the three reflects **racial diversity**. These videos are located at the *Accomplished Teaching Learning & Schools* (ATLAS) website, to which you will be provided access and a specified list of videos from which to select your choices.

Use the template below to: (1) provide a description of the lessons you observed; (2) note your observation of the teacher, students, and physical environment; and (3) write a reflection on what you have learned from your observation.

Lesson 1

Case #:

Grade Level:

Description of Lesson (Provide a description of what the lesson is about):

Points of Focus

Teacher

- **Instruction** (clarity, teacher-/student-centered, questioning, materials)
- **Groupings** (small, whole class, activity in groups)
- **Interaction** (respect for students, monitoring student behavior)

Students

- **Involvement** (active, passive)
- **Evidence of learning** (carry out instructions, response to questions, presentations)
- **Classroom behavior** (attentive, cooperative, disruptive, on-/off-task)

Classroom/Physical Environment

Observation

<ul style="list-style-type: none"> • Organization (seating in rows/semi-circles, ability to move freely, decorations) • Resources (type, quality, use of) 	
<p>Personal Reflection Based on your observation provided above, write a brief reflection on what you have learned from this lesson. Make sure to make specific references to the teacher, students, and the classroom environment.</p>	

The primary goal of field experiences is for teacher candidates to observe and examine for themselves, how teaching and learning happen in the classroom. As described in the assignment, this was accomplished through what I frame as “points of focus”, which involves teacher candidates observing key aspects of the classroom which capture the learning environment in a general sense, and then reflect on what they have learned from the experience. Hence as outlined in the instructions above, the assignment required my students to observe the teacher’s pedagogical decisions, learners’ engagement, and the management of the physical environment and resources.

The learning experience provided by the prepracticum in general, and this assignment in particular, is an example of constructivist pedagogy in action. As underscored in this paper, the aim of constructivism is to provide learners the opportunity and support to develop knowledge on their own. Instead of a lecture on the dynamics of the classroom, I provided my students a structure to gain an informed personal understanding of how teaching and learning occur in that setting. It would not be an efficient or effective strategy however, to “throw” teacher candidates into the classroom and require them to observe without guidance, because it is unlikely that they will know what is salient to attend to. The exercise has to be a wholly intentional act. Therefore, as the expert resource, I provided a template delineating the specific areas my students should focus on. First, teacher candidates are required to observe the classroom teacher in terms of how they instruct, organize, and interact with their students. Second, they should observe the students in terms of their involvement in the lesson, evidence that they are learning, and their classroom behavior. And thirdly, teacher candidates should examine the physical environment in terms of how it is organized and the kind of available resources and their uses. For each of these points of focus, I have also provided specific details teacher candidates should attend to. For example, when observing the teacher in the area of instructional presentation, they should focus specifically on clarity, whether their approach is teacher-/student-centered, their questioning techniques, and the materials used to support the learning experience. In addition to the instructions provided in the assignment template, my students and I also analyzed a classroom video, where I highlighted and clarified the same three points of focus that would guide their independent observation for the assignment. Therefore, although my students had to develop (or reconstruct) the knowledge for themselves based on the videos they each select, I provided them the necessary support and autonomy to do so.

Collaborative Learning

Developing collaborative learning practices is (or should be) a key goal in all teacher preparation programs because teacher candidates be imparting, as well as exercising those skills in their future practice. At my university, teacher candidates are provided an abundance of opportunities to engage with the theory and practice of working in teams. Sample 3 below highlights one activity I have designed to provide this opportunity for my students. A major assignment in *EDUC 354 Educational Planning & Evaluation*, is for teacher candidates to work in subject area teams to design an assessment instrument (i.e., a traditional classroom test). This assignment is one of the key learning experiences intended to develop competency in my students to perform a major teacher responsibility – assessment of student learning. Therefore, as demonstrated below, I have invested much thought into the activity’s design and implementation. The assignment is twofold in terms of its purpose – it provides teacher candidates valuable experiential knowledge as they work on each task (process); and the outcome demonstrates their understanding of how to design the assessment instrument (product). This process-product engagement provides the opportunity for students to work collaboratively by sharing ideas and co-learning or co-constructing knowledge.

Prior to the assignment, I conduct a lecture and discussion on theories of assessment. This includes topics such as validity and reliability in assessment, subjective vs objective type items, using learning objectives to inform item construction, and formative vs summative assessment. Prior to the assignment, students are required to work in pairs or otherwise, depending on class size in a given semester, to research and present on an assigned

item type (i.e., true/false, multiple-choice, matching, completion, short-answer, and essay). For example, a pair of students is assigned multiple-choice items for which they should: (1) research the rules governing writing that item type; (2) generate sample items based on a learning objective; (3) formulate appropriate directions for the items; and (4) explain the advantages and disadvantages of the item type. Students would then present their findings for discussion, feedback, and any necessary clarification. This learning experience is geared towards equipping teacher candidates with an understanding of the different item types, and is then followed by the major assignment outlined in Sample 3.

Sample 3: Constructing a Traditional Classroom Assessment Instrument

Instructions: As a group of teachers, you have completed team-teaching a topic or unit to a set of **high OR middle** school students. Working as a collaborative group, formulate an assessment instrument (i.e., a test) to measure your students' understanding of what you have taught them. **If your group comprises more than one subject area, this should be reflected in the learning objectives and test items.**

(IMPORTANT: Make sure to provide: (1) clear instructions for each set of items; (2) the appropriate learning objective number beside each item (e.g., Obj.1); and (3) the total points for each set of items). Points will be deducted if you fail to follow these guidelines. (100 total points)

A. Contextualize the Test (10 points)

State the **topic/unit**

State **5 learning objectives** (They can be content and/or language objectives)

B. Create a test comprising the following item types: (60 points)

Five True-False items ($5+2+2+1 = 10$ points)

Five Multiple-Choice items ($10+2+2+1 = 15$ points)

One set of Matching items ($5+2+2+1 = 10$ points)

Four Completion items ($4+2+2+2 = 10$ points)

Two Short-Answer items ($4+2+2+2 = 10$ points)

One Essay item. **Note:** Math teachers should formulate a problem of the week (POW) type item instead of an essay item. ($2+2+1 = 5$ points)

C. Create (or adapt/borrow) a rubric containing at least 4 criteria and at least 3 levels to evaluate the **essay item** or the **POW** you have formulated. If you adapt/borrow a rubric, you must **state the source** and **explain in a paragraph its fit or relevance** to the essay or POW. **(10 points)**

D. Compile an Answer Key for the test (**exclude** the essay or POW) **(10 points)**

E. Use the True-False and Multiple-Choice items to create an online quiz in **Google Forms (10 points)**

NB: Please use template provided in Google Drive to create the instrument

An effective assignment, whether it is completed individually or collaboratively, requires very clear directions. For this assignment, I set up a context and provided very detailed instructions from the outset, and throughout the various steps. Teacher candidates are placed in a collaborative state of mind by considering themselves a group of teachers who have completed teaching a topic or unit. They must then work together to design an instrument to assess what students have learned from their teaching. As stressed in the course leading up to this assignment, an assessment instrument *must* be informed by the learning objectives that guided the instruction for the topic or unit to be assessed. Hence, in setting the “context” for this assignment, students are required to lay out the learning objectives. For this assignment I place students in content area groups as much as possible, but at times, I need to combine students from different concentrations in some semesters. In such cases, students will provide learning objectives from their respective subject area, hence producing a more interdisciplinary or integrated instrument. Next, based on the learning objectives, students work together to generate the items which must represent six major item types. Here they are expected to use the rules of item construction, which the class had researched, presented, and discussed prior to embarking on the assignment.

Principles of constructivist pedagogy are demonstrated in this learning experiences in some key ways. First, I provide the guidance and support necessary to prepare my students to go off on their own to uncover knowledge for themselves. That exploration is facilitated through a lecture and discussion of key tenets of assessment

theory I stated earlier. It is very important to underscore here how crucial it is in the constructivist model, to provide students the prerequisite knowledge in preparation to embark on independent learning and informed discovery. This element escapes many critics of constructivist pedagogy, and even educators who profess practicing the methodology. In addition to preparing students for the assignment, the clear directions and steps I have outlined in the assignment (Sample 3) represent guidance and support for learners. The second principle of constructivism evident in this assignment or learning experience, is the opportunity for students to (co-)construct knowledge for themselves. This is enabled by the collaborative work required in the pre-assignment research as well as the assignment itself. First, teacher candidates share ideas while co-discovering information about the different item types, as they work on the research and presentation prior to embarking on the assignment, hence co-constructing knowledge for themselves. Next, their understanding is deepened as they collaborate to produce the assessment instrument. Designing the assessment instrument involves teacher candidates in a process of negotiated decision making as they generate both objective and subjective items from learning objectives. It is important to note here too, how instrumental the *Google Drive* platform is in facilitating the collaborative element of this work, especially in a virtual environment. Although prior to COVID-19 my students worked collaboratively using the Google Drive platform for this assignment, the pandemic has made it even more apt to employ the tool for this work.

Using Assignment Templates

As I have highlighted in the introduction and background section, one misconception regarding the constructivist approach is that learners are largely left on their own devoid of guidance from the instructor, to discover knowledge for themselves. On the contrary, as I have discussed above, constructivist pedagogy requires that learners are provided the necessary guidance and support in order to be sufficiently prepared to embark on independent learning expeditions. One effective approach I have found in this regard, is the use of assignment templates. Although my preceding discussion involved the use of templates (Samples 2 and 3), I will now address the use of this strategy more directly. Sample 4 below is an assignment in my *Technology, Teaching & Learning* course. This assignment requires teacher candidates to identify and analyze an Internet resource they consider to be potentially useful for the classroom teacher. I organize my students into what I call Collaborative Learning Teams (CLTs) of 4 (as is possible) and provide them the template below to complete the assignment. The template is shared with each team on the *Google Drive* platform where they collaborate on the assignment in real time simultaneously, and separately as each component of the work requires.

Sample 4: Internet Resource Research and Analysis

Instructions: The Internet has revolutionized access to information in the 21st century. Educators now literally have at their fingertips, a wide range of resources that can greatly enhance the teaching and learning process. This assignment is designed for you as prospective teachers, to evaluate an Internet resource that you think can support your work in the classroom. Please use the assignment template below to evaluate an Internet resource of your choice. **(70 points)**

1. Working as a TEAM, name and describe your selected Internet resource. Make sure to write at least one paragraph that fully informs someone who has no knowledge of that resource. (10 points)

2. Working as a TEAM, identify 5 features of your selected resource that you think could be useful to teachers. (10 points)

Feature 1:

Feature 2:

Feature 3:

Feature 4:

Feature 5:

3. Discuss the pedagogical value of FOUR of the features you identified above. EACH team member should discuss ONE and write your name beside it. (20 points)

Pedagogical Value 1:

Pedagogical Value 2:

Pedagogical Value 3:

Pedagogical Value 4:

4. Discuss ONE way YOU personally would use this resource as a teacher. Each member of the group should provide her/his explanation - include your name. Make sure to personalize your response by using the pronoun "I". (20 points)

Team member 1:

Team member 2:

Team member 3:

Team member 4:

5. Evaluate your individual experience navigating the resource. Each team member should explain how easy or difficult it was for you to locate and understand information on this website. No position is wrong - report your personal experience, but make sure to provide an argument for your conclusion - say why. (10 points)

Team member 1:

Team member 2:

Team member 3:

Team member 4:

As noted above, teacher candidates are required to work in CLTs to research and analyze an Internet resource. Step 1 of the assignment requires them to describe the resource in such a way that sufficiently informs someone without knowledge of the material. Teacher candidates must work collaboratively to arrive at that description. Also, the description should be no less than a paragraph. This prevents teacher candidates from providing just a sentence for their description. For step 2 they are to identify five features of the resource that as a team, they

adjudge to be potentially pedagogically useful. Step 3 requires that each team member discusses the pedagogical value of one of the features they identified in step 2. This is important for individual teacher candidates to apply their own understanding of its significance to teaching and learning. This requirement also eliminates the concern that not all team members contribute to the work. The individual contribution continues in step 4 where each member discusses how they would utilize the Internet resource to inform personal practice in the classroom. I specifically require teacher candidates to use personal pronouns in their discussion. This is a way for them to think about their personal practice as well as to own their ideas. Finally, in step 4 students conduct an evaluation of their experience navigating this resource on the Internet. Again, this should be an individual account, requiring each student to actually interact with the resource.

The use of the assignment template to establish the parameters and guide this online learning experience, demonstrates constructivist pedagogy and aptly illustrates the idea explained earlier in the Model of Constructivist Pedagogy (Fig. 1). As described in the learning experience above, my students are at the center of this instructional model, while I am located on the outskirts of the learning zone, acting more as a “guide by the side”, instead of the traditional “sage on the stage”. My role as the instructor therefore, is to provide clearly delineated directions and thoughtful parameters to support the learning goals. I have demonstrated this principle through the detailed steps established for students to follow, as well as the physical layout of the template which provides the boundaries in which students are to operate when completing the assignment. The comment boxes, the subheadings for each step, designated sections for each team member, all operate to provide latitude and limitation according to the instructional objectives for this particular learning experience. Finally, the degree of independent learning required in this pedagogical process, was facilitated by the collaboration effectively facilitated through my employment of the Google Drive platform.

Summary

This paper was inspired by the abrupt halt of in-person schooling and the subsequent switch to a virtual modality. The purpose of the paper is to share my process as a teacher educator, in terms of how I utilized constructivist pedagogy in this situation occasioned by the COVID-19 pandemic. In particular, I demonstrated how selected assignments and strategies were implemented to sustain the integrity of teacher candidates’ learning experiences as they continued their education virtually.

As established in the foregoing account, the constructivist approach promotes the idea that learners (re)construct or uncover knowledge for themselves. This means that consequential virtual learning demands a significant degree of independence on the part of learners (Meyer, 2008), and (2) by extension, require judicious guidance and support from the instructor to facilitate that responsibility (Mayer, 2004; Kirschner et al., 2006). Since the context of online or virtual learning involves students exploring on their own, the instructor’s primary role has to be one of establishing the relevant learning parameters and providing judicious guidance to learners. This role is depicted in the “Model of Constructivist Pedagogy” diagram (Fig. 1) I conceptualized for this paper. The circle represents the boundary governing the learning experiences, while the instructor is situated on that parameter, providing the necessary guidance to learners. If not, students may wander away from the intended instructional and learning goals. Within the “Zone of Active Learning” however, students are provided sufficient latitude which allows for ample learner exploration within the boundaries of the learning objectives. Without this balance between the learning goals and the opportunity to explore, certain learners might be too restricted.

Microteaching, field experience, collaborative learning, and the use of assignment templates are selected sample tasks representative of key areas of work in our teacher education program. In the discussion above on operationalizing constructivist pedagogy, I provided a description and an explanation of how each task is executed in a related course; then I analyzed how each employs principles of constructivist pedagogy to facilitate learning in a virtual or online environment. Essential to constructivist pedagogy is the guidance and support that the instructor needs to provide prior to and during the learning experience (Deslauriers et al., 2019; Cubukcu, 2009; Field et al., 2015; Zimmerman, 1986). In that regard, I have described the role of pre-assignment learning experiences, judicious instructions, instructor and peer feedback, rubrics, and guided steps to facilitate independent learning. The assignments presented here demonstrate key principles of constructivism such as active learning, the opportunity for learners to construct and co-construct knowledge for themselves, and hopefully to nurture seeds of lifelong-long learning. Although just a small sampling of the plethora and range of the work that we do as educators, the learning experiences shared in this paper, provide a sense of the affinity between constructivist pedagogy and virtual learning.

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