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Article

Applying Kolb's Learning Theory to Library Instruction: An Observational Study

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Abstract

Objective – This article answers the following questions: does applying Kolb's Learning theory to library instruction enhance student engagement and will it improve librarian teaching practices?

Methods – This observational study analyzed four forms of qualitative data to examine the learning experience of first year nursing students and the teaching experience of two Faculty Librarians. The four forms of data collected were: (1) post-class qualitative feedback to assess the students' engagement; (2) library instructors' shared teaching observations; (3) librarian peer feedback after observing each other teach; and (4) feedback from an instructional facilitator on the individual librarian's teaching skills. Two distinct lesson plans were developed: Lesson Plan One was the first attempt at incorporating Kolb's theory into practice and Lesson Plan Two was a refinement of Lesson Plan One. Teaching strategies were altered from one lesson plan to the next based on the instructional facilitator's feedback. The role of the instructional facilitator was to

guide the professional development of new instructors by providing them with information and feedback on their teaching skills.

Results – There were perceived improvements in student engagement and teaching practice from Lesson Plan One to Two. Although the students' reported experience remained similar from one to the next, both the librarians and instructional facilitator felt the students were more engaged and the environment seemed more collaborative when following Lesson Plan Two. With the second lesson plan, librarian instructors experienced a positive transformation as teachers, becoming facilitators of learning rather than lecturers.

Conclusion – Incorporating Kolb's theory into instructional practice resulted in librarian instructors perceiving a positive effect on both instruction and on student engagement in the teaching-learning process.

Introduction

At our polytechnic institution, librarians are often called upon to teach learners from a variety of programs, from trades to health sciences, to business and technology programs. Like the majority of teaching faculty at the institution, librarians do not have a diploma or degree in adult education. In an attempt to address this education deficiency, our institution requires instructors in all programs and services, including library services, complete the Faculty Certification Program (FCP), an adult education teaching certificate, in order to retain their positions. The courses required to complete the certificate include adult learning theories, instructional strategies, adult development, technology in teaching, curriculum design, evaluation of learning, and leadership. FCP is designed to provide new instructors with the basic knowledge and skills needed to teach adult learners. The challenge that our polytechnic librarians have, that other teaching faculty do not, is that we often teach single sessions to students in a variety of programs. This means librarians lack the opportunity to get to know students' strengths, challenges, and learning preferences over time. Our participation in the FCP program prompted us to ask the question: would applying a learning theory to an information literacy workshop increase student engagement, given that

librarians often teach single sessions to a variety of student groups?

In the fall of 2014, as liaison librarians for a baccalaureate nursing program, we (the authors of this article) were asked to provide four three-hour workshops on database searching and American Psychological Association (APA) writing style to 150 first-year nursing students. Previously, we had both taught the workshop independently of one another but the students who met with us to ask follow-up questions indicated inconsistencies in their understanding resulting from two different instructors teaching the workshops. So we embarked on this project in order to bridge this gap and to apply what we learned in FCP to our instructional practice. Our two main objectives were: 1) to improve student engagement with information literacy skills instruction and, 2) to grow as professionals by perfecting our teaching skills. This paper describes the process of applying Kolb's learning theory to practice and our reflection of that process towards achieving student engagement and becoming better instructors.

We chose Kolb's theory because it postulates that experience is a critical aspect of the learning process, which aligns well with library instruction as it often involves hands-on experience in order to make sense of learning (Kolb, 2014). According to Kolb's theory (2014), teaching to various learning styles and

facilitating the learner's progression through the learning cycle is necessary in order to create new knowledge. Because this theory highlights the importance of experimentation, reflection, and abstract conceptualization, it is suited to information literacy instruction; research skills and information literacy are more than just imitating keystrokes, they require creativity and critical thinking.

Literature Review

A literature search was conducted to find publications on the topic of how to incorporate Kolb's learning theory in library instruction. Although librarians are applying learning theory to instructional practice, using approaches such as Tiered Instructional Programs (Bowles-Terry, 2012), Adult Learning Theory (Lange, Canuel, & Fitzgibbons, 2011) and Evaluation Methodologies (Schilling & Applegate, 2012), we were unable to find any specific examples of the application of Kolb's theory. Woods (2012) provides a list of suggestions on how to consult Kolb's cycle of

learning when planning information literacy sessions by emphasizing the use of a variety of teaching strategies to meet the preferences of all learners. Other than Woods' suggestions for *how to incorporate* Kolb's theory we were unable to find literature on librarians *actually applying* Kolb's theory to their instruction. One reason for this may be that as librarians generally conduct one-shot information literacy sessions in a wide array of programs, the varying subject matter and timeframes make the application of Kolb's theory difficult. Other teaching faculty see students daily or weekly and therefore have the ability to get to know the students over time. These faculty have time to build on previously-taught concepts, assess learning, and adjust their teaching strategies and materials as needed, making it easier to apply adult learning theory to instruction.

While little research exists on using Kolb's theory to guide library instruction, its use in the fields of adult education, business, social work, and nursing has been well documented. Kolb's learning theory includes learning styles and his
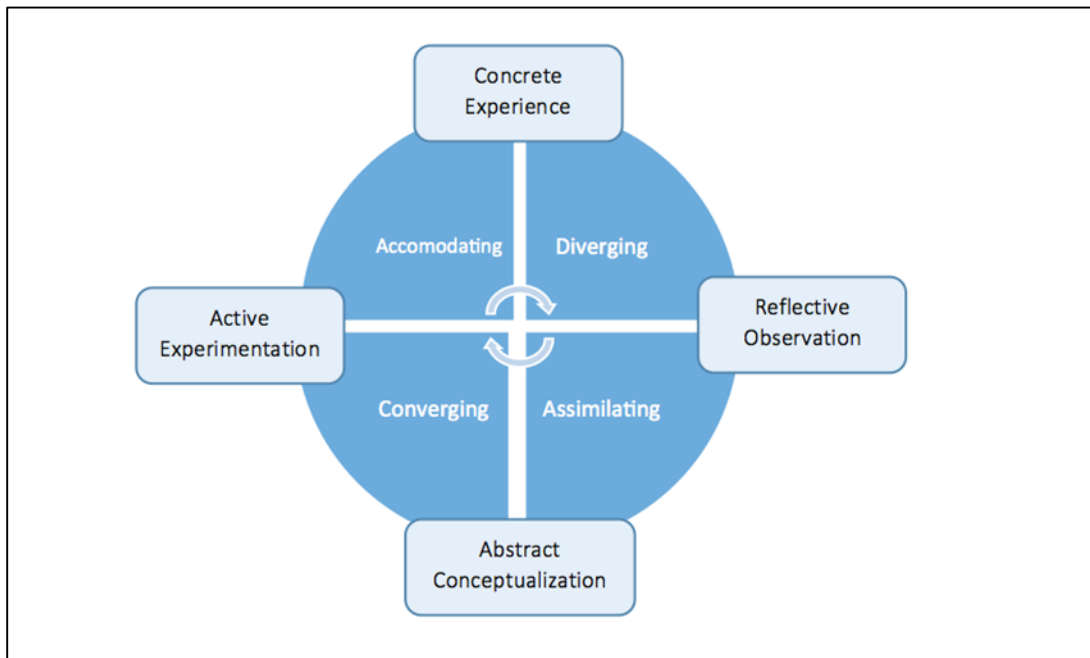

Figure 1
Kolb's Experiential Learning Theory. Adapted from *Experiential learning: Experience as the source of learning and development*, by D. A. Kolb, 2014, Upper Saddle River: Pearson. Copyright 2014.

cycle of learning (Figure 1). Since its conception in 1984, academics and practitioners in the field of education have analyzed and implemented Kolb's theory into their practice. Even today, Kolb continues to inform instructional design (Bergsteiner, Avery, & Neumann, 2010; Lisko & O'Dell, 2010; D'Amore, James, & Mitchell, 2012; Cox, Clutter, Sergakis, & Harris, 2013).

According to Kolb & Kolb (2005), there are four types of learning styles that instructors may encounter in every classroom:

- Diverging style learners are able to view experiences from multiple perspectives, are creative, open minded, interested in people, imaginative, emotional, open to feedback, are able to gather information, have broad interests, and enjoy group work. These learners enjoy concrete experiences and reflective activities.
- Assimilating style learners are logical and are able to understand a wide range of information. They are less interested in people and are more interested in ideas, concepts, and theory. These learners may prefer lectures, reading, exploring models, and having time for abstract conceptualization and reflection.
- Converging style learners can put theory into practice and solve problems. These learners may prefer technical tasks and problem solving to social or interpersonal experiences. They learn best through abstract conceptualization and active experimentation.
- Accommodating style learners learn from active experimentation and concrete experiences. These learners rely on others for information and group work to achieve their goals (Kolb & Kolb, 2005, pp.196-197).

For learning and knowledge creation to occur, Kolb & Kolb (2005) contend that instructors must create a learning space that is welcoming and respectful of past experiences while meeting the learner's current needs. They must also provide a space for conversational learning, experimenting and reflecting, which encourages intrinsic motivation and allows learners to take charge of their own learning. In Kolb's learning cycle, learners move through: (1) concrete experiences, using past and present experiential learning to inform new learning; (2) reflective observation, which leads to (3) abstract conceptualization, which is followed by (4) active experimentation (Kolb, 2014). New knowledge is only created through active experimentation and reflection (Lisko & O'Dell, 2010).

Determining which learning style is characteristic of students in a particular discipline is difficult. D'Amore et al. (2012) explored the learning styles of first-year undergraduate nursing and midwifery students at an Australian university, and found that the majority of the students surveyed were "divergers" (p. 507). Although they were able to identify a dominant learning style, the authors conceded that as people move through various stages of growth and development, they become capable of drawing from all four learning styles. D'Amore et al. (2012) therefore concluded that students should "not rely solely on one style" (p. 514). Cox et al. (2013) identified the learning styles of senior students in four undergraduate health programs and found a variety of learning styles in both the classroom and clinical setting and that no predominant learning style emerged. The evidence therefore indicates that it is important for educators to use a variety of teaching strategies in order to engage learners with different learning preferences. Accordingly, creating a lesson plan that piques the interest of all four learning styles is more important than identifying what type of learner a student might be.

There is a connection between the skills built through experiential learning and the skills required to become information literate. In their study, Devasagayam, Johns-Masten, and McCollum (2012) found that requiring students

to participate in experiential exercises that require application to reinforce learning and are strengthened through repetition, is an effective way to teach information literacy because it encourages critical thinking via problem solving. Clem, Mennicke, and Beasley (2014) describe experiential learning as something involving an experience that engages the physical body "in an effort to holistically enhance the process of learning" (p. 491). They have found that students learn better when the teaching approach is student-centered, when students can take control over their learning, and when the lesson is relevant to them. Lisko and O'Dell (2010) believe that active experimentation and reflection are essential to transform learning into knowledge creation.

From the current literature on Kolb's theory being applied to nursing instruction, it can be summarized that nursing students have a variety of learning styles, that their styles can change over time and according to the learning environment (whether classroom or clinical), and that nursing students prefer a variety of experiential learning strategies. Halcomb and Peters (2009) changed the curriculum for an undergraduate nursing course to incorporate more reflective and active learning. They surveyed their students at the end of the course and found that there was a positive response to the variety of interactive teaching strategies introduced (Halcomb & Peters, 2009). Lisko and O'Dell (2010) changed a medical-surgical nursing curriculum to meet the varied learning styles of their students by incorporating more scenario and experiential based teaching. Overall, their student and faculty feedback was positive and the authors felt that their methods enabled the "development of nursing students' critical thinking abilities" (Lisko and O'Dell, p. 108). Crookes, Crookes, and Walsh (2013) found that nursing students preferred various experiential and reflective teaching techniques: technology tools, simulations, gaming, art,

problem-based learning, and narrative activities for reflection and for linking theory to practice. Based on a review of the literature, the application of Kolb's theory is well-suited to the nursing classroom.

Methods

This study answered the following questions: Does using Kolb's theory in library instruction enhance student engagement and does it improve teaching practice? Four forms of qualitative feedback were collected to determine how Kolb's theory contributed to the students' engagement and how it improved our instruction: (1) we assessed the learning experience using a student post-class qualitative feedback form; (2) we reflected on our teaching; (3) we provided feedback to each other after observing one another teach, and; (4) an instructional facilitator, whose job description is to guide and support the growth of instructional faculty, observed and provided feedback to us on our teaching skills.

Student Feedback

The student post-class qualitative feedback form asked students to respond to the following questions:

1. How did you feel about your [research and APA skills] before the session?
2. How did you feel about your [research and APA skills] after the session?
3. What do you attribute the cause of the change in how you feel if there was a change?
4. What was the most impactful thing you learned?
5. What teaching activity was least useful and why?

The feedback provided us with guidance and resulted in changes to the lesson plans as well as modifications to our teaching strategies.

Librarian Reflection and Peer Feedback

In an effort to reflect and share our teaching experiences, we met to debrief at the end of each lesson. We discussed the following questions:

1. How did you feel about your teaching experience?
2. What were the students' reactions to your teaching strategies?
3. What changes to the content or teaching strategies would you make to improve student engagement?

These questions encouraged us to reflect, to gain insight, and to become aware of the impact of our teaching practices on the learners. In the debriefing sessions after implementing the revised, second lesson plan from which we team-taught, we provided verbal feedback regarding one another's performance. This feedback led to further reflection and discussion.

Faculty Facilitator Feedback

The faculty facilitator's knowledge, experience and expertise in guiding the professional development of instructors provided us with further insight into best teaching practices. She observed our teaching, made notes, and provided verbal feedback to us after each teaching session. Her suggestions led to further discussion and changes to our lesson plan and teaching strategies.

All four forms of qualitative feedback were transcribed in a Microsoft Word document, which we used to change our lesson plans, and to track our progress as teachers. Our first attempt at incorporating Kolb's theory into our teaching practice was delivered to the first group of nursing students (Lesson One). Then, after processing feedback, a second lesson plan (Lesson Two) was created to more effectively incorporate Kolb's theory.

Lesson One: First Attempt at Incorporating Kolb's Theory

We met to create one common lesson plan: learning goals, learning content, teaching materials, and teaching activities. For this lesson, we incorporated Kolb's theory based on our interpretation. We chose our teaching strategies based on our teaching experience and our learning styles. Our teaching strategies included asking pre-assessment questions about past experiences, a lecture, and a demonstration followed by individual activities. We stayed at the front of the room and came to the students who asked for help. Our discussion questions focused on their understanding of what was lectured on or what was demonstrated. A post-assessment form was used to assess students' experience and the instructors debriefed afterwards to discuss our teaching experience and our observation of students' engagement.

We asked the faculty facilitator to observe our teaching sessions and give us feedback on our instructional methods. She observed that we had not incorporated Kolb's theory into our lesson plan effectively. She commented that although our lesson plan had elements of Kolb's theory, such as reflective and experiential activities, we were not teaching to all learning styles, nor did we facilitate moving the students through the learning cycle. She felt that our lesson plan was more traditional than experiential. Using her suggestions, our reflection of our practice, our feedback to each other, and the students' feedback, we created a new lesson plan that incorporated more experiential learning and reflection as suggested by Kolb's theory.

Lesson Two: Effective Incorporation of Kolb's Theory

Kolb's theory was incorporated into our teaching material, activities and strategies in the following ways:

- We taught this workshop as a team in order to learn from each other through reflective observation and discussion.
- We facilitated the class activity, discussion and learning instead of lecturing from the front of the room. We engaged all learners by walking around the room as we talked and asked reflective questions of learners sitting at the front, middle and back of the classroom.
- We facilitated a discussion on their past concrete experiences with research and APA style, giving them time to reflect before beginning questioning.
- We facilitated discussions and provided time for a dialogue of student observations, ideas, and opinions on their new learning.
- Through a learning activity on database searching, we encouraged students to search using their usual methods and then to try a new approach to research before coming to a conclusion. We encouraged them to use their past experiences, and to observe and reflect, as well as actively experiment with new approaches to search.
- To teach APA style, we used paired learning activities for peer-to-peer support and peer-to-peer learning, and we encouraged them to independently search for answers using a variety of resources.

Understanding that we needed to facilitate their movement through the Kolb's cycle of learning, we used a variety of teaching strategies designed to appeal to different learning styles:

- For assimilating style learners, the lecture combined with discussion questions encouraged reflective observations.
- For assimilating and diverging styles, a video and a demonstration, as well as classroom discussion and a reflective post-class survey, encouraged the

sharing of reflections and observations.
- For diverging and accommodating styles, paired activities allowed for active experimentation and concrete experiences.
- For assimilating and converging styles, individual activities allowed for active experimentation and concrete experiences.

Additionally, the emphasis on reflective sharing and paired activities required that the students remain focused and accountable.

Results and Discussion

Students' Reflection and Feedback

We wanted to know if the students in Lesson One, where we first attempted to incorporate Kolb's theory, had different experiences from the students in Lesson Two, where we more effectively incorporated Kolb's theory after student feedback and our own reflection. Students completed a post class survey meant to facilitate reflection. From this survey we were able to gather some general conclusions about their experiences. There were no remarkable changes in the student feedback from Lesson One to Lesson Two. The majority of students in both sessions responded that: (1) they felt a positive change in their level of confidence after our teaching sessions; (2) they attributed the change to what they learned in the session; and (3) they found the session to be valuable and useful, with a few students finding the content to be confusing at times. Some suggestions for changes from both student groups included: increase the length of the session, decrease the length of the session, incorporate a break, and slow the pace of the lesson. These results may indicate that different students had different needs and that different aspects of our teaching appealed to each type of learner in each session regardless of teaching Kolb-style or not.

The student survey was not designed to evaluate our teaching effectiveness. It was meant

to encourage student reflection on their learning experience as reflective observation is a key component of Kolb's theory (Kolb, 2014). This activity allowed learners to reflect on what they had learned, what they did not understand, and prompted them to take control of their learning by seeking answers or librarian support.

Both librarians and the instructional facilitator perceived a change in student engagement between Lessons One and Two. We collectively observed the students to be more engaged when Kolb's theory was more effectively incorporated into the lesson. The students appeared more focused on their learning activities, and more involved in the paired and classroom discussions and group work, and there was more time allotted for reflection and active experimentation. We perceived them to be less distracted and more actively involved in all aspects of learning.

Facilitating Students' Movement Through Kolb's Cycle of Learning

Kolb's theory is about facilitating learning by moving learners through each stage of the learning cycle so that they may be able to understand and transform their learning into new knowledge (Kolb, 2014). Knowledge creation is facilitated if learners are able to resolve the cognitive dissonance between their previous learning experience with new learning, between concrete experience and abstract conceptualization as well as between reflective observation and active experimentation (Kolb, 2014). The following section provides an example of how we facilitated students' movement through the learning cycle in the database searching portion of the class.

Concrete Experience

At this stage, learners rely on their concrete experiences as they approach a task, using knowledge and skills based on both past and present experiential learning. We gave the students time to demonstrate their current

searching skills on a research question related to their course assignment. Most students used internet search engines, some used Google Scholar, and a few used databases. Although some were successful at finding journal articles, none searched in a systematic manner.

Reflective Observation

Reflective observation is about critically analyzing the learning and considering the impact of what has been learned. First, we facilitated a reflective conversation in which they shared their approaches to finding journal articles. We taught the students how to systematically search by introducing them to the following skills: creating a search strategy, using subject terms and keywords, choosing the appropriate databases, using limiters, and applying the same search strategy across various databases. To encourage reflective observation, we provided time to conduct searches using both the new method they had just learned and their previous methods. The students compared their results, and then shared their findings with a peer, then the class. This provided another concrete experience on systematic searching and facilitated another reflective discussion on their new experience.

Abstract Conceptualization

At this stage, learners critically analyze the new skills and think about how it applies to them accomplishing a task. In order to facilitate this internal, personal, and individualized cognitive process, we asked the students to work with a peer to create a new a search strategy in order to find peer reviewed journal articles for their research question. This activity encouraged them to collaboratively work through a problem and think critically about their past and new learning experiences in order to create an individualized approach to systematic searching. It was our hope that they would synthesize their original method with ours to complete this search.

Active Experimentation

At this stage, learners experiment with what they have learned and adapt it to their individual style in order to accomplish a task. We encouraged the students to adapt what we taught them and merge it with any previously successful searching strategies as they attempted to apply the new skills to their new search. We acknowledged there are different ways to search systematically and we encouraged students to experiment in order to find what will work best for them in the future.

Librarian Experience: Reflection and Feedback

The general themes that arose from our reflection and feedback sessions with each other and with the faculty facilitator are highlighted in Table 1.

Our reflective practice, inspired by applying Kolb's Experiential Learning Theory to library instruction, has been essential to our growth and development as adult educators. Self-reflection and soliciting feedback from multiple sources encouraged insight and awareness of the effects of our teaching styles. Through this process we learned the value of making time to debrief with each other in order to facilitate our instructional development. We learned to value our differences while challenging ourselves to try new strategies in an effort to improve student engagement with information literacy skills.

Librarian Experience: Kolb's Cycle of Learning

For our professional development, we used Kolb's theory to process what we had learned about library instruction when we used his theory to guide teaching practice. We reflected on our learning style and teaching strategies as we progressed through Kolb's cycle of learning

in order to gain insight into our teaching practice. The following section outlines our movement, as instructors, through Kolb's cycle of learning.

Concrete Experimentation

In Lesson One, we created content, teaching activities, and teaching strategies based on our past learning and teaching experiences and preferences. Student feedback was generally positive and our perception of the lesson was that it was organized and well managed. The students appeared engaged in the learning activities as they all completed the assigned tasks. We later realized that we were looking for strengths in our practice that validated our bias that we were effective instructors. The objective feedback from the instructional facilitator, an experienced instructor of adult education who observed our teaching, provided us with information that challenged our thinking and our practice.

The instructional facilitator's feedback on Lesson One, our first attempt at incorporating Kolb's theory, was as follows:

- During the lecture some students were engaging in their own conversation or using the computer for other purposes.
- The students appeared bored and distracted at times, especially those students sitting at the back of the room.
- We stood at the front of the room and mostly engaged with learners at the front. We did not engage learners from all areas of the classroom.
- We asked closed ended questions about comprehension but did not wait for responses.
- We did not ensure student accountability for their learning activity, nor did we evaluate their search queries or their APA exercise.

Table 1
Self Reflection and Feedback Session

	Self-Reflection	Peer Feedback	Faculty Facilitator Feedback
Lesson One	*On our teaching:* • Well organized • Good time management • Lesson was relevant and applicable to students – the lesson aligned with a research assignment the students were expected to complete for their nursing course • Overall, satisfied with lesson plan and teaching strategies *On student engagement:* • The students were focused on learning activities. • Most students participated in activities.	*We discussed:* • the pros and cons of our different communication styles, as they had an effect on our delivery of the lesson plan. • the pros and cons of the content we emphasized during the session (e.g., APA references vs. APA citations might receive more emphasis depending on the teacher).	*On our teaching:* • Teaching styles did not appeal to all types of learners. • We stood at the front of the room and lectured. • Our questioning did not encourage reflection and critical thinking from the students. *On student engagement:* • Low engagement. Many students were not engaged in learning, but were searching other websites.
Lesson Two	*On our teaching:* • Initially, we were reluctant to try new teaching strategies. • We felt a time pressure in modifying the lesson by applying Kolb's theory. • Over time we felt we had expanded our knowledge with the new teaching strategies. • We felt empowered by the new strategies. • We perceived the lesson to have been a success. • The lesson was relevant because it was tied to a course assignment. *On student engagement:* • Greater student discussion, collaboration and focus on their learning activities	*We discussed* • Recognition of our different teaching styles. • Appreciation for one another's strengths as teachers. *We noted:* • We had become more learner-centered and less teacher-centered. We would ask ourselves questions like what is the impact of our actions on the learners? We focused less on how we liked to teach and how we liked learn. • We had become facilitators of learning instead of lecturers. • We learned how to effectively give and receive feedback.	*On our teaching:* • A variety of teaching styles were used to meet the needs of various learners. • We moved around the classroom engaging learners from all corners. • The activities were more reflective, stimulating critical thinking. *On student engagement:* • High engagement. All students participated in the activities rather than visiting other websites.

The instructional facilitator recommended the following changes be made in order to more effectively incorporate Kolb's experiential theory:

- When lecturing, walk around the room to get the attention of learners from all corners of the classroom.
- Have paired activities for peer-to-peer learning and support as well as individual activities for those learners who prefer to work on their own.
- Encourage discussion and reflection by asking reflective questions and giving students time to answer.
- Ensure students are engaged by randomly asking reflective questions to students in all corners of the classroom.
- Ensure students are accountable for their learning by asking them to show you how they search or how they apply APA.
- Give students time to experiment and compare their past search practices with the new approaches that have been introduced.

Reflective observation

Transforming the lesson

We compared the feedback from the instructional facilitator to our observations of the students with our first attempt at incorporating Kolb's theory. From our point of view, the students appeared engaged and we questioned the need for change. We were reluctant to incorporate the changes due to time constraints. Creating an experiential lesson plan would require the addition of new activities for reflection, abstract conceptualization, and active experimentation. All of these additions are time-consuming and we questioned the feasibility of incorporating Kolb's theory into practice. Ultimately, we decided to experiment with the suggestions and assess the student's engagement when Kolb's theory was applied *properly*.

Our Learning Styles

Another insight we had was: as teachers, our learning styles affect our teaching styles. In our previous experiences of teaching this class, we focused on content, teaching activities, and teaching strategies that were based on what we valued, our past experiences as learners and instructors, our learning style preferences, and what we learned in our Master's of Library and Information Studies and FCP. Completing Kolb's learning style inventory revealed that one of us favors a converging learning style, while the other is a combination diverging and assimilating style learner. Converging style learners tend to have a natural instruction style, which focuses on the practical application of searching skills which can be applied to the student's assignment, whereas the assimilating/diverging learner favors reflecting in a structured way through organized activities such as lectures, readings and discussions in order to explore new ideas and skills (Kolb, 2007). Teaching strategies such as brainstorming sessions and using guided logical conversations to find solutions to problems may appeal to assimilating/diverging learners.

These differences in our learning styles as instructors became evident throughout the project. At the completion of each lesson, we would often view different learning activities as having been the "most impactful" in cultivating student engagement and we would often disagree on strategies for moving forward. Upon reflection, we found strengths in these differences that resulted in teaching approaches neither of us had considered before. We came to realize, as Kolb states, "ideas are not fixed and immutable elements of thought but are formed and reformed through experience" (Kolb, 2014, p. 36).

Abstract conceptualization

Using Kolb's theory in library instruction presented some challenges in terms of the time required to move students through the learning

cycle. To add to this, we understood some of the criticisms of Kolb's learning style and cycle of learning. Coffield, Moseley, Hall, and Ecclestone (2004) did a systematic review of various learning styles models with the objective of evaluating the validity and reliability of the theories, claims, and applications of these models. Coffield et al. (2004) found the reliability and validity of the learning style inventory and learning cycle to be questionable. For example, matching teaching style with learning style does not improve academic achievement (Coffield et al., 2004). Despite this, the value of using Kolb's theory to guide library instruction is that it provides a theoretical framework to guide practice to use past experiences in present teaching, and to provide time for reflection and abstract conceptualization (critical thinking) as well as time for active experimentation (testing ideas and theories). It is also learner-centered and reminds instructors to teach to a variety of learning styles in the classroom.

Active experimentation

We decided to experiment with team teaching for Lesson Two. Having two instructors in the room enabled us to use each other's strengths and expose the students to two different styles of teaching, thereby appealing to more learning styles in the classroom. Two librarians in the classroom enabled us to monitor students' completion of tasks and to ask them to show us how they applied what they learned to the learning activities. We and the faculty facilitator observed that the students in Lesson Two appeared more engaged in learning activities, reflection, and discussion. Student feedback was consistently positive in both Lesson One and Lesson Two.

Limitations and Next Steps

The amount of time required to implement Kolb's theory was an issue. Because the delivery of certain content was required, there was insufficient time to incorporate the reflection

and abstract conceptualization required for a true experience of Kolb's cycle of learning. That we saw the students only once also limited our opportunities for follow-up on student engagement, and subsequent adjustment of our teaching strategies. Another limitation is that we did not randomly assign students to a control group, taught without applying Kolb's theory, and an experimental group, taught applying Kolb's theory, to measure any differences in student satisfaction or achievement of learning outcomes. The results observed during this process were based on our reflection and our perception of our performance and the impact on student engagement. There was no objective measurement of student engagement or teaching effectiveness.

This paper focused on our reflective practice and perceptions of the teaching-learning process as we incorporated Kolb's theory into library instructional practice. Future researchers may want to focus on gathering empirical data in order to measure student satisfaction with information literacy skills instruction when librarians incorporate various learning theories into their teaching practice. Interested researchers may also want to compare the effectiveness of using Kolb's theory on student learning outcomes and comparing that to when librarians use another adult learning theory to guide teaching practice.

Conclusion

In this observational study we incorporated adult learning theory into two distinct lesson plans, delivered to two groups of students from the same program, completing the same assignment. Four types of qualitative feedback appeared to affirm that there were improvements in student engagement from Lesson One to Lesson Two. It appeared that the effective incorporation of Kolb's theory resulted in greater student engagement and a more collaborative classroom environment. Additionally, we experienced a transformation as teachers. We became more thoughtful,

deliberate, and aware of our teaching purpose and goals and their potential effect on student engagement. The incorporation of multiple teaching strategies that address a variety of learning styles enabled us to facilitate the students moving through the cycle of learning in order for knowledge creation to occur. Applying theory to practice increased our knowledge of adult learning theory and teaching practice, challenged our beliefs that we were already effective instructors, and motivated us to try new strategies that we had not considered, such as team teaching and being observed by a peer and a faculty facilitator. This study motivated us to change our practice to enhance student engagement and to develop into more effective information literacy instructors.

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