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Examining the Benefits Associated with Implementing an Active Learning Classroom among Undergraduate Students

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The last 35 years have shown a greater interest among higher education professionals to adapt the principles of active learning within the classroom. Active learning, an instructional approach that allows students the opportunity to participate in the process of learning, requires them to do something more than just passively receive instruction. Increased student engagement, participation, and learning have long been linked with active learning, but little is known about any additional benefits. The focus of this study was to identify and examine any additional benefits associated with active learning above and beyond those of increased engagement, participation, and learning. A sample of 45 undergraduate students were randomly assigned to one of two treatment groups: active learning or traditional lecture. Results indicate that in addition to engagement, participation, and learning, active learning also promotes increases in communication and interactivity, community and connectedness, satisfaction, and flexibility.

Within the last 35 years there has been a greater interest among higher education professionals to adapt the principles of active learning in their classrooms (Baepler & Walker, 2014; Barnes, 1989; Cooperstein & Kocevar-Weidinger, 2004; Freeman et al., 2014; Huda, Ali, Nanji, & Cassum, 2016; Kyriacou, 1992; Stoltzfus & Libarkin, 2016). Active learning, an instructional approach that allows students the opportunity to participate in the process of learning, requires them to do something more than just passively receive instruction (Bonwell & Eison, 1991). When educators implement active learning in the classrooms, students are required to go beyond solely listening to course content to being fully engaged with reading, writing, discussing and solving problems (Bean, 2011). To be successful in an active learning course students must assess and examine the course material beyond the traditional lecture format. Students must not only do things, but actively and intentionally think about the things they are doing, both in and out of the classroom (Bonwell & Eison, 1991). Ultimately, active learning is a student-centered approach to teaching and learning.

Closely associated with the principles connected with the educational theory of constructivism, active learning operationalizes the principles of constructivism and, as such, one cannot truly exist without the other (Anthony, 1996; Cooperstein & Kocevar-Weidinger, 2004). This theory is based on the belief that learning occurs when students are actively engaged in their own educational process and are able to connect meaning with knowledge through experiences (Anthony, 1996; Gray, 1995; Merrill, 1991). This requires students to take ownership and responsibility over their own learning experiences (Tam, 2000).

Previous research demonstrated the rich benefits associated with implementing active learning. For example, Michael (2006) stated, "[T]here is an enormous wealth of research supporting the benefits of active learning in helping students master difficult subjects" (pp. 164-165).Furthermore, Bonwell and Eison (1991) concluded there is a clear link between increased student learning and active learning. Prince (2004) identified "support for all forms of active learning" (p. 229) and demonstrated a strong connection between increases in student engagement, participation, and learning with the implementation of active learning teaching strategies. Additionally, a meta-analysis of 225 peer reviewed research articles compared collegiate traditional lecture courses with collegiate active learning courses and found that active learning significantly reduced failure rates. In fact, on average, students in the traditional lecture classroom were 1.5 times more likely to fail when compared to those students in an active learning classroom (Freeman et al, 2014).

Additional research has shown an increase of over 37% in grades of college students enrolled in an active learning classroom over a traditional lecture classroom (Hoellwarth & Moelter, 2011). Active learning has also been shown to significantly increase knowledge retention, student engagement, and overall student success (Baepler & Walker, 2014; Costello, 2017; Huda et al., 2016; Olson & Riordan, 2012; Petersen & Gorman, 2014; Prince, 2004; Stoltzfus & Libarkin, 2016). However, these studies all focused primarily on three main benefits of active learning: increased student engagement, increased student participation, and increased learning. Increases in student engagement, participation, and learning have been demonstrated in a variety of educational disciplines through active learning integrating a wide range of active learning teaching techniques. Yet, it is still unclear how active learning provides additional benefits within the context of constructivism.

Student Engagement, Participation and Learning through the Theory of Constructivism

Active learning techniques lead to increased engagement, participation, and learning due to their foundation on constructivism. It is the student's role and responsibility to be actively engaged with the learning process (Von Glasersfeld, 1989). The student needs to construct their own knowledge by looking for meaning of the new material and relating that meaning back into their own personal belief system (Von Glasersfeld, 1989). Unlike a traditional lecture classroom delivery, the responsibility for learning does not rest upon the teacher to teach and the student to sit passively absorbing the course material. Therefore, the teacher must become comfortable serving as a facilitator, helping the student obtain his or her own understanding of the course material (Cooperstein & Kocevar-Weidinger, 2004). In support of the notion of facilitation, Rhodes and Bellamy (1999) stated:

> A teacher tells, a facilitator asks; a teacher lectures from the front, a facilitator supports from the back; a teacher gives answers according to a set curriculum, a facilitator provides guidelines and creates the environment for the learner to arrive at his or her own conclusions; a teacher mostly gives a monologue, a facilitator is in continuous dialogue with the learners (p. 23).

Another characteristic of constructivism is that the instructor and the student are equally involved in the learning process; both learning from one another (Ertmer & Newby, 1993; Fosnot & Perry, 1996; Von Glasersfeld, 1989). This requires constant engagement and the building of a relationship between the student and the educator, more so than traditional teaching theories require. This relationship requires that the educator serve as a guide to facilitate and coordinate learning, rather than merely dispensing course materials (Gagnon & Collay, 2005; Tam, 2000).

The benefits of increased engagement, participation, and learning from active learning and constructivism have been well documented across disciplines. However, additional benefits are less established. Chen (2015) has called for further studies on the impact active learning has on student group dynamics and on a student's sense of community within the classroom. Freeman et al. (2014) indicated further research is warranted to explore the relationship of active learning and instructor/student communication. Henshaw, Edwards, and Bagley (2011) further support this engagement of additional research on the role interactions, both between students and with the instructor, and how it plays in active learning. Jensen, Kummer and Godoy (2015) called for increased examination on student flexibility in active learning classrooms.

Therefore, the focus of this study was to identify and examine additional benefits associated with active learning providing greater insight into student engagement, participation, and learning.

Methods

Study Population and Design

A convenience sample of 45 junior and senior undergraduate students (6 men, 39 women) participated in this study. Their inclusion in the study was based upon their enrollment in a recreational therapy undergraduate 300-level course at a traditional 4-year public university in the midwestern portion of the United States. All students were declared majors in recreational therapy. After enrollment, students were randomly assigned to one of two course sections. The first section, the control group, received a traditional lecture approach. The second section, the experimental group, received an active learning instructional approach. Both course sections received the exact same curriculum, assignments, and exams delivered in the same classroom and by the same instructor. Both sections met at the same time of day, although they did meet on different days of the week. Students were blind to the random assignment and were not aware of the differential instructional delivery. Every measure was taken to ensure that the only difference between the two sections was the method of instructional delivery (traditional lecture or active learning). A similar model has been used successfully with psychology students (Benjamin, 1991) and among biology students (Brooks, 2011; Jensen et al., 2015) to effectively impose a quasi-experimental design.

Questionnaire (Pre-test and Post-test)

Students were given a pretest and posttest survey on the benefits of active learning using the Active Learning Classroom Student Survey (ALCSS) (Joosten, 2014). The ALCSS was created by Joosten at the University of Wisconsin-Milwaukee and designed to capture the benefits and perceptions of students in active learning classrooms (2014). We made two minor changes to the ALCSS to adapt them to our study, including removing the phrase 'active learning course' and replacing them with 'this course' for all survey items to maintain integrity of the blinding between course sections. The second minor change was converting the survey into present tense to allow for pre-test and post-test survey administration. In total, we included 44 survey items examining student participation, engagement, learning, communication/interactivity, community/connectedness,

flexibility and satisfaction in the course questionnaire. Student responses to the survey items were measured using Likert scales that ranged from 1 to 5 (1-strongly disagree, 2-disagree, 3-neither agree or disagree, 4-agree, 5-strongly agree). The questionnaire was administered to the students during class time using an online survey platform, Qualtrics®. The pretest was administered during the first week of the course, and the posttest was administered on the last day of the course.

Measures

All study measures came from the aforementioned ALCSS questionnaire and were grouped into seven domains. These domains are described in detail below.

Participation in this study was defined as a student's contribution in class (Fritschner, 2000). This was measured by asking them questions such as, "The way this course is designed has increased my participation in the learning experience," and, "The way this course is designed has made me want to attend & contribute more in class."

Communication and interactivity were defined as the process of speaking, working, and influencing one another (Wei, Peng, & Chou, 2015). This was measured through the ALCSS by asking questions such as, "The way this course is designed has promoted better communication with my instructors," and, "The way this course is designed has allowed me to interact more with my instructor."

For the purpose of this study community and connectedness were defined as the process of being actively involved with another person or group in a manner prompting comfort, well-being, and a sense of belonging (Hagerty, Lynch-Sauer, Patusky, & Bouwsema, 1993; Laux, Luse, & Mennecke, 2016). This was measured by asking them questions such as "The way this course is designed has made collaboration with my classmates easier," and, "The way this course is designed has promoted my connection with the instructor through discussions."

Student engagement was defined as the degree of attention, interest, willingness, curiosity, and effort a student showed towards what they were learning (Fredricks, Filsecker, & Lawson, 2016). Engagement was measured by students' positive or negative responses to these two statements: "The way this course is designed has increased my willingness to put forth effort to complete the learning activities," and, "The way this course is designed has not increased my curiosity about the course subject." Engagement was measured by students' positive or negative responses to these two statements.

Student learning is the gaining of knowledge or skills through study, experience, and instruction (Entwistle & Ramsden, 2015; Savery, 2015). Student learning was measured by students' positive or negative responses to these two statements: "The way this course is designed was beneficial to my learning," and, "The way this course is designed has did not help my learning in the class."

For the purpose of this study student flexibility was defined as a student's ability to change, compromise, or modify their learning for their benefit. This was measured through the ALCSS by asking questions such as, "The way this course is designed has made it easier to share information," and, "The way this course is designed has allowed us to adapt the room for different activities."

Student satisfaction was defined as the "results when actual performance meets or exceeds the student's expectations" (Elliott & Healy, 2001, p. 3) resulting in fulfillment and/or pleasure. This was measured by asking the students questions such as "The way this course is designed has led to a way of interacting that was exciting" and "The way this course is designed has enhanced the in-class exercises."

Statistical Analysis

In order to avoid potential grading biases, the analysis of the survey results took place following the completion of the semester. Assumptions of normality were checked through descriptive statistics and histograms. Before analysis, the data was reviewed and checked for errors, missing data, or outliers. Due to the small sample size, to prevent issues with collinearity, and in keeping with past literature, independent mean's t-test comparing the two sections were used for analysis instead of regression techniques (Jensen et al., 2015; Mason, Shuman, & Cook, 2013). Levene's test for equality of variances was utilized to compare across course sections. An a priori p-value of $p<0.05$ was used to determine statistical significance. We analyzed differences for all of the 44 survey items across the 7 domains. Results were analyzed using SPSS 24.0.

Results

The pre-test results indicate that there were not any statistically significant differences in the survey items between the courses, suggesting that the two course sections were interchangeable at the start of the semester regarding participation, engagement, and learning. An analysis of the post-test means indicated students in the active learning section exhibited significantly higher scores on 16 of the 44 ALCSS survey items than did students in the traditional lecture section. A review of these 16 items revealed that students in the active learning section exhibited an increase in all seven domains of the ALCSS: participation, communication/interactivity, community/connectedness, engagement, learning, flexibility, and satisfaction.

Table 1
Group Statistics – ALCSS

Questions - The way this course was designed…	Group	N	Mean	Std. Deviation	Std. Error Mean
COMMUNICATION/INTERACTIVITY: - … promoted better communication with my instructors.	Control	23	3.696	.974	.203
	Test	21	4.381	.805	.176
COMMUNICATION/INTERACTIVITY: - … allowed me to interact more with my instructor.	Control	23	3.174	.984	.205
	Test	21	3.762	.539	.118
COMMUNICATION/INTERACTIVITY: - … limited my opportunities to interact more with the class.	Control	23	2.609	1.033	.215
	Test	21	1.714	.902	.197
COMMUNITY/CONNECTEDNESS: - … made collaboration with my classmates easier.	Control	23	3.435	.992	.207
	Test	21	4.429	.676	.148
COMMUNITY/CONNECTEDNESS: - … promoted my connection with the instructor through discussions.	Control	23	2.696	1.295	.270
	Test	21	4.286	.644	.140
COMMUNITY/CONNECTEDNESS: - … lead to increased cooperation in completing assignments.	Control	23	3.087	.996	.208
	Test	21	4.333	.796	.174
SATISFACTION: - … was fun.	Control	23	3.826	.887	.185
	Test	21	4.333	.658	.144
SATISFACTION: - … led to a way of interacting that was exciting.	Control	23	3.609	1.033	.215
	Test	21	4.238	.768	.168
SATISFACTION: – T… enhanced the in-class exercises.	Control	23	3.739	.864	.180
	Test	21	4.429	.598	.130

Participation

Students in the active learning section indicated that "the way their [class] section was designed made them want to contribute more in class" (M = 4.429, SE = .111) than the students in the traditional lecture section (M = 3.956, SE = .204). Levene's test for equality of variances was significant so equal variance between the two sections was not assumed. This resulted in a significant difference t (33.692) = -2.038, $p < .05$.

Communication and Interactivity

Three items under communication and interactivity indicated a difference between the two groups. Students in the active learning section had higher mean scores on "better communication with their instructor" and "more interactions with their instructor" than their peers (see Table 1). Both of these items were significant at $p < .05$ (see Table 2). Students in the active learning section also had lower mean scores on "decreased opportunities to interact with the class" than their peers in the traditional lecture section (see Table 1). This item was significant at $p < .005$ (see Table 2).

Community and Connectedness

Three items related to community and connectedness revealed statistical significance. These items involved course design which "made collaboration with my classmates easier," "promoted my connection with the instructor through discussions," and "led to increased cooperation in completing assignments." Students in the active learning section had higher mean scores for all three items than the students in the traditional lecture section (Table 1). Additionally, all three items were significant at $p < .001$ (Table 2).

Engagement

Two items related to student engagement were significant. Students in the active learning section indicated that the course design "increased my willingness to put forth effort to complete the learning activities" (M = 4.429, SE = .148), more so than students in the traditional lecture section (M = 3.870, SE = .181). Students in the active learning section also had lower mean scores on "did not increase my curiosity about the course subject" (M = 1.667, SE = .144) than the students in the traditional lecture (M = 2.783, SE = .188). "Increased willingness to put forth effort in completing learning activities" was significant t (42) = -2.365, $p < .05$. Lower mean scores of "did not increase my curiosity about the course subject" were also significant t (42) = 4.648, $p < .001$.

Learning

Results from this study identified two significant items related to learning. Students in the active learning section had higher mean scores on "the way this course was designed was beneficial to my learning" (M = 4.333, SE = .159) than students in the traditional lecture

Table 2
Independent Samples Test – ALCSS

The way this course was designed…		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
COMMUNICATION/ INTERACTIVITY: – … promoted better communication with my instructors.	Equal variances assumed	1.125	0.295	-2.530	42	0.015	-0.685	0.271	-1.232	-0.139
	Equal variances not assumed			-2.552	41.610	0.014	-0.685	0.268	-1.227	-0.143
COMMUNICATION INTERACTIVITY: - … allowed me to interact more with my instructor.	Equal variances assumed	5.114	0.029	-2.425	42	0.020	-0.588	0.243	-1.077	-0.099
	Equal variances not assumed			-2.486	34.709	0.018	-0.588	0.237	-1.068	-0.108
COMMUNICATION/ INTERACTIVITY: - … limited my opportunities to interact more with the class.	Equal variances assumed	0.892	0.350	3.046	42	0.004	0.894	0.294	0.302	1.487
	Equal variances not assumed			3.065	41.926	0.004	0.894	0.292	0.305	1.483
COMMUNITY/ CONNECTEDNESS: - … made collaboration with my classmates easier.	Equal variances assumed	3.779	0.059	-3.845	42	0.000	-0.994	0.258	-1.515	-0.472
	Equal variances not assumed			-3.911	38.980	0.000	-0.994	0.254	-1.508	-0.480
COMMUNITY/ CONNECTEDNESS: - … promoted my connection with the instructor through discussions.	Equal variances assumed	12.843	0.001	-5.081	42	0.000	-1.590	0.313	-2.222	-0.958
	Equal variances not assumed			-5.225	32.875	0.000	-1.590	0.304	-2.209	-0.971
COMMUNITY/ CONNECTEDNESS: - … lead to increased cooperation in completing assignments.	Equal variances assumed	0.300	0.587	-4.557	42	0.000	-1.246	0.274	-1.798	-0.694
	Equal variances not assumed			-4.604	41.307	0.000	-1.246	0.271	-1.793	-0.700
SATISFACTION: - … was fun.	Equal variances assumed	0.596	0.444	-2.137	42	0.038	-0.507	0.237	-0.986	-0.028
	Equal variances not assumed			-2.166	40.385	0.036	-0.507	0.234	-0.980	-0.034
SATISFACTION: - … led to a way of interacting that was exciting.	Equal variances assumed	2.175	0.148	-2.275	42	0.028	-0.629	0.277	-1.188	-0.071
	Equal variances not assumed			-2.306	40.416	0.026	-0.629	0.273	-1.181	-0.078
SATISFACTION: - … enhanced the in-class exercises.	Equal variances assumed	1.475	0.231	-3.049	42	0.004	-0.689	0.226	-1.146	-0.233

section (M = 3.565, SE = .197). Students in the active learning section also had lower mean scores on "the way this course was designed did not help my learning in the class" (M = 1.714, SE = .122) than the students in the traditional lecture section (M = 2.522, SE = .165). Student responses to "the way this course was designed was beneficial to my learning" were significant t (42) = -2.995, $p < .01$ while student responses to "the way this course was designed did not help my learning in the class" were also significant t (42) = 3.874, $p < .001$.

Flexibility

Student flexibility was defined as a student's ability to change, compromise or modify their learning for their benefit. Two items relating directly to flexibility were significant. Students in the active learning section had higher mean scores on "the way this course was designed made it easier to share information" (M = 4.333, SE = .144) than students in the traditional lecture section (M = 3.261, SE = .129). The active learning students also had higher mean scores on "the way this course was designed allowed us to adapt the room for different activities" (M = 4.667, SE = .105) than the students in the traditional lecture section (M = 3.826, SE = .162). Student responses to "the way this course was designed made it easier to share information" was significant t (42) = -5.568, $p < .001$ and responses to "the way this course was designed allowed us to adapt the room for different activities" were significant t (42) = -4.258, $p < .001$.

Satisfaction

Three questions linked to satisfaction resulted in statistical significance. The questions were, the way this course was designed: "was fun," "led to a way of interacting that was exciting," and "enhanced the in-class exercises." These mean scores were all greater in the active learning section than in traditional lecture section (see Table 1). Increases in the items "the way this course was designed was fun" and "the way this course was designed led to a way of interacting that was exciting" were significant at $p < .05$ (see Table 2). The item "the way this course was designed enhanced in-class exercises" was also significant, but at $p < .005$ (see Table 2).

Discussion

The focus of this study was to identify and examine additional benefits associated with active learning providing greater insight into student engagement, participation, and learning. The results of this study support previous research demonstrating that increases in student engagement, participation and learning are firmly established benefits of active learning. The findings also identified four additional active learning classroom benefits: communication and interactivity, community and connectedness, satisfaction, and flexibility.

The results were consistent with existing literature on active learning. For example, Bonwell and Eison (1991), as well as Costello (2017), found that active learning plays an important role in increasing student learning. Additionally, Prince (2004) and Freeman et al. (2014) both found that active learning helps increase student engagement and participation. These results also supported Chen's (2015) call to further examine the role active learning plays in establishing a sense of belonging and community in the classroom. By creating a sense of belonging and community in a classroom an instructor can continue to help and support the education of their students. Henshaw, Edwards and Bagley (2011) discussed the need to further explore the student and instructor interactions resulting from active learning. These findings support that need by establishing communication and interactivity as a firm benefit of active learning, something that is frequenting missing in traditional classroom settings (Stoltzfus & Libarkin, 2016). To date, the research supporting interactivity as a benefit of active learning is limited, and additional study is warranted. These findings also support Jensen, Kummer, and Godoy's (2015) request that student flexibility in an active learning classroom be more closely examined. These findings indicate that student flexibility does indeed increase in an active learning classroom when compared with a traditional lecture classroom.

Recommendations

The findings in this study support the existing literature on the benefits of active learning as well as begin to address some of the gaps in that literature. This study also identifies four additional lesser known benefits of actively learning: increases in communication and interactivity, community and connectedness, satisfaction, and flexibility. Therefore, the following recommendations are made in respect to teaching and learning. First, it is recommended that active learning be implemented in all forms of higher education. The rich benefits associated with active learning are so much greater than traditional lectures that instructors who do not utilize active learning are, quite possibly, failing their students. Second, whereas the benefits of increased participation, engagement, and learning are well established in the active learning literature, the additional benefits of increases in communication and interactivity, community and connectedness, satisfaction, and flexibility are significantly less established. Additional research needs to be undertaken to firmly establish these additional benefits.

Limitations of this study included a small sample size and a non-random sample. As such, the generalizability of the results is limited to the test sample. Another limitation is the lack of reliability and validity with the ALCSS. Additionally, the students in this study may have discussed the differences between the two sections with students from other sections. This may have resulted in skewed results.

Future studies should examine the role active learning plays in developing a sense of community, connectedness, and belonging in the classroom. An exploration on the types of active learning tasks and techniques that help foster this greater sense of community would be appropriate in a variety of higher education classrooms. Future studies can explore the impact communication and interactivity, created through active learning, have on student learning. Additionally, the benefits of increased student satisfaction and flexibility as products of active learning need to be further examined. It might also be interesting to link studies specifically with course outcomes and observe if they are met, and to what extent, through active learning.

Active learning has the potential to greatly increase the quality of higher education teaching and learning across disciplines and majors. It has the power to engage and motivate students above and beyond what traditional lecturing has historically accomplished. Active learning has the ability to not only increase student participation, engagement, and learning, but also to foster a greater sense of community and increase students' communication, flexibility, and student satisfaction.

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