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Message from the Editor-in-Chief

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April 01, 2020
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A COMPARISON OF COMPUTER BASED TESTING AND PAPER AND PENCIL TESTING IN MATHEMATICS ASSESSMENT

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Abstract
Today's schools turn to computers for all aspects of learning, including assessment. While advantages to computer testing do exist, the comparability between paper pencil tests (PPT) and computer-based tests (CBT) must be considered. This study examined whether the testing medium impacts student performance in math assessment by addressing three questions. First, does a test mode effect exist, as evidenced by mean score difference between a CBT and a PPT? Second, does question type: multiple choice, constructed response, or extended response, relate to student performance? Third, does either gender or computer experience and familiarity impact CBT and PPT scores? Eighty 6th grade students took math tests with half of the questions on a PPT and half of the questions on a CBT. A computer familiarity survey was completed prior to the unit tests. Significant differences were found for one of the unit tests and for some of the question types.
Keywords: paper-pencil tests, computer-based tests, test mode effect, mathematics assessment, item construct

Introduction

Technology plays an increasingly integral role in education today. This is evidenced in the daily instruction from teachers, to student interactions with the curriculum, and even to homework completion. One component of this increasingly technology-driven classroom is CBTs, computer based tests. The trend of CBT in lieu of the traditional paper and pencil tests, PPT, is witnessed across all academic subject areas. It is a trend also experienced at both the individual classroom level and at the state level on standardized tests.

Advantages of Computer Based Testing

The use of CBTs has numerous benefits for both students, teachers, and educational systems. One such benefit is the real-time scoring and immediate feedback provided by CBTs (Jeong, 2012). With reduced grading time, teachers are able to increase their teaching time (Eid, 2005). The individualized student data generated from CBTs can facilitate teacher instruction to be more strategically directed to enhance individual student goals (Johnson & Green, 2006). Due to the ease at which they can be manipulated, numerous test versions can easily be created, thereby increasing test security (Bodmann & Robinson, 2004; Poggio, Glasnapp, Yang, & Poggio, 2005). Additionally, the ease with which these tests can be manipulated lends itself to increased student control over testing and a medium that is easier to individualize for testing accommodations for students with learning disabilities (Bodmann & Robinson, 2004; Flowers, Kim, Lewis, & Davis, 2011; Jeong, 2012). Finally, the move to CBTs provides a more cost-effective way to assess students, reducing paper costs, administration costs, and scoring costs (Jeong, 2012; Threlfall, Pool, Homer & Swinnerton, 2007).

The Importance of Comparability

While the advantages of CBTs are numerous, a foremost consideration must be whether or not CBT and PPT are equivalent in their assessment of content knowledge and understanding. It must be assured that they reflect a student's content proficiency, not computer proficiency (Puhan, Boughton, & Kim, 2007). As previously noted, the administration of computerized tests is less expensive than the administration of paper and pencil tests, but this is only true after the school or district is in possession of the devices. And while technology has become commonplace in schools, most schools and districts have not made a complete switch to computerized assessments due to financial or infrastructure constraints, thus CBTs and PPTs co-exist during this transitional stage and must be comparable in their assessment of student performance (Minnesota Department of Education, 2012). This dual testing mode is especially significant when used in large scale programs, such as statewide assessments (Kim & Huynh, 2007). Results from statewide assessments are aggregated across individuals taking tests using different modes, so scores from the two testing modes must be interchangeable (Bennett et al., 2008; Poggio et al., 2005). Additionally, as CBTs are increasingly used in other high stakes testing situations, such as certification testing, licensing, and graduate exit exams, comparability is paramount (Keng, McClarty, & Davis, 2008; Puhan et al., 2007). Finally, comparability is critical for tests, such as the PISA, the Programme for

International Student Assessment, which has transitioned to CBT, as it is used for longitudinal data (Logan, 2015).

Previous Comparability Studies

Previous studies have been conducted to determine comparability between the test modalities and have resulted in varied findings; some indicate that CBT and PPT scores are comparable, while others indicate a performance advantage for either CBT or PPT. Bayazit and Askar (2012) examined a test administered to Turkish university students across the two testing modes. While the mean score for the PPT was slightly higher, it was not a statistically significant difference. Similarly, another university study in which students were alternately administered two tests over the course of two weeks in CBT and PPT versions found no testing modality difference for test scores (Bodmann & Robinson, 2004). While both of these were small scale university studies, similar results have been found in large scale testing conditions.

An examination of a PRAXIS test, measuring reading, writing, and math, found only a small effect size (< .20) and determined overall test mode comparability (Puhan et al., 2007). Deeper examination of the test explored individual item level comparability. Differential Item Functioning (DIF) analysis was used to determine if the item measured different abilities for different groups. Despite the score differences between the two testing mediums on the math and reading portions of the test, the test items were found to be comparable. A mode DIF on items in the writing portion was found to exist. Kim and Huynh (2007) found no statistically significant score difference for students taking End of Course (EOC) exams for Biology and Algebra. Though the Algebra mean scale score was higher for PPT and ANOVA revealed a significant mode effect, the effect size was determined to be 0.17 and thus small. Poggio et al. (2005) examined 7th grade math scores from a statewide assessment in Kansas in which 48 schools administered parallel CBTs and PPTs. No statistically significant score differences were found between the testing modes. Though 9 of the 204 items were found to function differently between the mediums, it did not impact composite scores. Likewise, Johnson and Green's (2006) analysis of middle school students' performance on a mathematics test from the National Curriculum for England garnered similar results. No statistically significant differences existed on overall performance, indicating CBT and PPT comparability. A similar finding was observed in an examination of student performance on a test modeled on the end of course assessment used in England (Threlfal et al., 2007). While these studies demonstrate comparability between testing modes, other studies have found higher scores on one mode over the other.

Eid's (2005) analysis of 5th grade females completing a math problem solving test on alternately administered CBTs and PPTs showed a statistically significant difference occurring between the two testing modes, favoring the CBT. Another study examined the mode effect of CBT and PPT on a multiple-choice test taken by students with ADHD (Lee, Osborne, & Carpenter, 2010). A statistically significant difference was found favoring those students in the CBT condition. Likewise, Clariana and Wallace (2002) examined the posttest scores of students in a CBT or PPT condition on a 100-question multiple choice test. The results showed a statistically significant difference with a large effect size in favor of the computer test takers. These studies show an advantage for CBT, but numerous other studies reflect one for PPT.

Flowers et al. (2011) examined data for students in grades 3-8 with a read aloud accommodation from a large-scale statewide assessment of reading, math, and science. Effect sizes ranged from small to large, but favored the PPT condition in almost all grades and subject areas, even though the CBT condition afforded students greater control over their read aloud accommodations. Another study considered the test performance for students with a learning disability taking the Mod-MSA, an alternative to the Maryland School Assessment. Students were assigned to alternatively matched groups based on their previous year's MSA scores, and placed in a computer based testing condition or a paper testing condition. Students taking the PPT scored higher than average on the PPT, with the main effects significant for both reading and math (Taherbhai, Seo, & Bowman, 2012).

Studies involving students in the general education population have also had results favoring test performance on a PPT. A study of 6th graders' scores in four academic areas found that students scored higher on the PPT for all four academic areas, with significant differences in two content areas, Korean language arts and science (Jeong, 2012). In a second study, the scores of 804 6th graders were analyzed on a mathematics-only CBT and PPT (Logan, 2015). The results determined a statistically significant difference for half of the domain areas, with PPT scores higher than CBT scores.

Such favorability with PPTs has also been seen on statewide examinations. Keng et al. (2008) looked exclusively at item level differences on a statewide assessment in Texas. Results determined significant differences for items in all subjects for 8th grade and for math and reading in 11th grade. These differences generally were in favor of PPTs. An analysis of the Mathematics Minnesota Comprehensive Assessment Series III, or MCA-III revealed

higher student performance on the PPT for all grades (Minnesota Department of Education, 2012). Though effect sizes were small, score differences were statistically significant for grades 3-7. Finally, results from the Math Online study, or MOL, were considered (Bennett et al., 2008). The mean scale score for the two modes was statistically significant in favor of the PPT version, though the effect was moderated as computer familiarity increased, as measured by a background questionnaire. The computer-based scores reflected greater variety than the paper based tests.

Explanations for Score Differences

Explanations for score differences have been proffered and examined in numerous studies. Issues that can impact student performance and test score have included testing duration, content domains and problem-solving strategies, testing administrative factors, gender, and computer familiarity.

Duration. Bayazit and Askar (2012) found no difference in student performance on the two testing modalities despite a statistically significant difference in duration. The average time spent on the online test was 40.53 minutes, while the paper pencil test was 34.26 minutes. Another study found increased performance on PPTs along with increased duration on the PPT with the average time of the PPT at 17.49 minutes and the CBT at 15.16 minutes (Dimcock, 1991). Similarly, Bodmann and Robinson (2004) found a statistically significant difference in test duration with the PPT taking an average of almost 4 minutes longer than the CBT. In this case though, the dual test modes resulted in comparable student performance. In an effort to further examine the test mode effect on test times, a second experiment was conducted in which three different CBT conditions were created, all allowing varying levels of flexibility for review and answer changing. In the CBT condition that most closely resembled the PPT condition with the greatest level of flexibility test duration did increase but still did not affect test scores. Studies that have examined test taking duration have resulted in mixed results, with some revealing increased duration for CBT and others revealing increased duration for PPT.

Domain and strategy. Domain effect was examined in the analysis of a mathematics test that was broken into five domains (Logan, 2015). Means scores were higher on PPT versions, and significant differences were found in three domains: Whole Number, Algebra Patterns, and Data and Probability, favoring PPT takers. In all of these domains, the PPT allowed affordances not available to those using CBT. These include students' ability for working out multi-step representations of their work, such as drawing models. It is suggested that the multi-step nature of the problems could cause an increase in cognitive load when answered on the CBT. Such findings were similar to another study that found student performance on PPTs to be higher than CBTs, and additionally found mathematical domains that benefited from the affordances given to PPT users (Keng et al., 2008). These domains included Linear Functions, Geometric Relationships, and Spatial Reasoning. The added burden of transferring drawings from screen to paper increased the difficulty of the CBT. The ability to draw on items on the PPT was an additional support given to PPT users.

Problem solving strategies not just tied to specific domains are also seen to be impacted by the testing medium. Johnson and Green (2006) analyzed the test results from the mathematics test of the National Curriculum for England and found numerous instances of strategy influenced by test mode, such as the ability of students to rotate angles on paper but not on the computer, the prevalence of employing portioning strategies to solve computation problems on paper, and the affordance of creating models to solve problems. Strategies also moderate according to question construct, such as constructed response (Bennett et al., 2008). When answering constructed response on a CBT, students have a more difficult time answering in an alternative way, such as providing a diagram, a beneficial option that would be available on a PPT. Another affordance granted PPT users is the ability to see question and problem relationships within the test (Johnson & Green, 2006). During testing administration, it was observed that PPT users had a greater tendency to preview the entire test, enabling them to note question relationships. It was also observed that PPT users were more likely to review and amend answers. It has been suggested that CBTs permit allowances for math problems in which elements must be arranged to determine a solution, while PPTs permit allowances for math problems in which geometric shapes must be drawn and measured (Threlfall et al., 2007). The fact that affordances are given based on the testing mode calls into question whether either test mode is assessing what was meant to be assessed.

Testing administrative factors. Testing administration factors have also been considered for their impact on test mode effect. These factors include testing processes unique to the test mode that potentially impact the examinee's experience. Bayazit and Askar (2012) found that while CBT and PPT scores were comparable, students took longer to complete the CBT due to the physical dimensions of the computer. The amount of information shown on screen is a fraction of what is shown on paper, causing students to use their time to scroll to see what would be completely visible on paper. Other studies have found scrolling to be of concern as well. The lower resolution of CBTs makes it more difficult to read long passages; however, if resolution is adjusted to

be higher, the result is increased scrolling, again making the reading of long passages more difficult (Jeong, 2012).

Another study exclusively explored CBTs under three conditions, in regard to screen size and resolution (Bridgeman, Lennon, and Jackenthal, 2003). It was observed that screen size and resolution impact the amount of text visible to the reader which impacts the amount of scrolling required. The increased scrolling did not impact math scores, but it did negatively impact the verbal scores. Likewise, a study found comparable overall CBT and PPT scores with item level and domain level differences favoring PPT (Keng et al., 2008). Sizable graphics on the math test resulted in all the answer choices on the CBT being unable to fit on the same screen, resulting in students needing to go to the next page to see the remaining answer choices. In comparison, the PPT users were able to view the large graphic and all answer choices on one page. Additionally, reading test scores were found to be comparable on the CBT and PPT versions, yet favored the PPT version on item level and objective level questions when scrolling was required or reading passages appeared on split screens. Poggio et al. (2005) found comparable CBT and PPT scores in his study of a statewide math assessment, but also found 9 of 204 items that functioned differently. These items were determined to be more difficult in CBT mode, as they contained large items that required scrolling.

Gender and familiarity. Gender and computer familiarity have been considered to account for score differences. Jeong (2012) found the male mean CBT scores were significantly different in comparison to PPT scores in only one of four academic areas whereas, females had statistically significant lower scores on three of the four academic areas for CBT scores, suggesting a gender gap on computer usage. Students in this study had been receiving weekly computer literacy lessons for five years; however, the students were all new to CBTs. Bennett et al. (2008) conversely found gender did not account for test mode differences on the lower scoring CBT, but that increased computer familiarity moderated the test mode effect for CBTs. While Clariana and Wallace (2002) found statistically significant score differences favoring CBT, they also concluded that gender was not a factor but instead, computer familiarity was the most fundamental issue in score differences, with previously identified higher abled students performing even higher on the CBT. Additionally, in terms of gender, no differences were found in other studies (Lee et al., 2010; Poggio et al., 2005). Analyzing the scores of middle school students from a national mathematics test in England, boys were found to be more likely to fail to submit an answer when testing on either mode (Johnson & Green, 2006). This difference was moderated when testing on the computer.

Student Perception and Preference

Student perception and preference between the testing modalities has been examined. Online tests have been described as providing a more relaxed testing environment and a more enjoyable visual medium (Bayazit & Askar, 2012). On the other hand, CBT examinees also noted that it was more difficult to answer long questions because of the typing and they found they lost motivation and time due to screen disturbances and noises. Johnson and Green (2006) observed a similar finding regarding a relaxed environment. They suggested that answering test questions on a computer provides a less personal experience. Once the child submits an answer on the computer, they no longer see that response, as they do with a paper test. On a paper version of a test, a child continues to be exposed to their previous questions, including those they may have struggled with, leading to a more stressful environment. In contrast, the computer provides an "out of sight, out of mind" experience, leading to a less stressful testing environment. This notion was reinforced by the majority of students who felt that computer based questions were easier than paper based questions (Bayazit & Askar, 2012). Both of these studies resulted in comparable CBT and PPT scores (Bayazit & Askar, 2012; Johnson & Green, 2006).

Other studies have found that preference and perception did not correlate to performance. In the analysis of students with read aloud accommodations, it was found that students preferred the CBT over the PPT and predicted that they performed better on the CBT, despite a higher overall PPT score (Flowers et al., 2011). Conversely, the examination of CBT and PPT scores by students with AD/HD found a statistically significant difference in scores, favoring CBT examinees, even though the majority of test takers expressed a preference for paper and pencil for its affordance of being able to write on the test (Lee et al., 2010). In a study of 6th grade students randomly assigned to an online or paper number line estimation task, an analysis of preference and performance concluded that preference did not result in increased performance. It was determined that even though 71.8% of the students preferred the tablet to the paper version of the task, the performance on the two modes was comparable (Piatt, Coret, Choi, Volden, & Bisanz, 2016).

Research Questions

With the ever-increasing presence of computers in society, schools are turning to computers for all aspects of learning, including assessment. Numerous studies have explored the equivalency of computer based testing and

paper and pencil testing, CBT and PPT, respectively. The purpose of this study will be to further examine whether the testing format impacts student performance, specifically in math assessment. The initial question will be whether there is a test mode effect, as evidenced by a difference in mean scores between a CBT and a PPT.

While the mean scores can provide an overall understanding of CBT and PPT equivalence, an examination of the impact of test question type will need to be considered. Increased focus on students' ability to not only correctly perform math equations, but to interpret and solve problems, as well as justify the responses has led to the addition of constructed response items and extended response items on math tests. Therefore, the second research question will seek to determine if the question type, specifically, multiple choice, constructed response, and extended response, has an effect on student performance on CBT and PPT scores.

When score differences between CBT and PPT have occurred, previous research has sought to provide explanations. While item level differences, such as question type, may provide one explanation, additional factors may contribute to score differences. These factors include gender and computer experience. The final research questions will examine if gender has an impact on CBT scores and if computer experience and familiarity is related to CBT scores.

Method

Contextual Factors

This study was conducted in a school district in north Georgia. It is a large district in a community that is experiencing growth. Specifically, it is the 7th largest district out of the 180 districts in Georgia and is part of a community that is the 11th fastest growing community in the United States. The county, with a population of 221,009, has a median household income of $88, 816 and a median housing value of $267,300 (US Census Bureau, 2016). The school district consists of 37 schools, including 21 elementary schools, 10 middle schools, and 7 high schools. The total student enrollment is 44,673 and is comprised of the following: 15.21% Asian, 3.39% Black, 12.94% Hispanic, and 65.22% White students. The district has been experiencing increases in diversity, with the largest increase in Asian students. Free or reduced lunch is received by 17.65% of the students in the district.

The school at which the study was conducted is more racially and ethnically diverse in comparison with the district, with 25% Asian, 8% Black, 26% Hispanic, and 26% White students. The school has a lower socio-economic profile than the district, with 30% of the students receiving free or reduced lunch.

Participants

The participants in the study were 80 6th grade students, 34 boys and 46 girls, from four math classes, comprised of two co-taught classes, one on-level class, and one advanced class. One co-taught class had 20 students, and the other one had 17 students. The on-level class had 18 students, and the advanced class had 26 students. There were 12 special education students and 4 gifted and talented students in the classes. The 6th grade math curriculum does not have a singular focus, such as algebra or geometry, but instead draws on the following five mathematical domains: ratios and proportional relationships, the number system, expressions and equations, geometry, and statistics and probability. The demographics of the students in the classroom were similar to those of the school.

Materials/Measures

Testing materials. Two unit tests were utilized for the study. The questions on the tests came from a bank of test questions that were created by teachers in the county. All 6th grade students in the county are administered tests that are created from the test bank of questions. The tests are required to contain multiple choice, constructed response, and extended response items. The first test, Unit 5 Test, assessed student knowledge, understanding, and application of one step equations. The second test, Unit 6 Test, assessed student knowledge, understanding, and application of area and volume. Each of the two tests were taken in the students' regular math classroom or in the co-teacher's classroom.

For each test, half of the questions were administered using a paper pencil test and half of the questions were administered using a computer based test. Each standard had an equal number of questions that were answered on paper and on the computer. Every question on the PPT had a DOK, depth of knowledge value, and there was a corresponding question on the CBT with an identical DOK. These questions were also identical in both construct and format. For example, if a standard required a student to solve a one-step equation, the student had a multiple-choice computation question on both the PPT and the CBT (Appendix A). If the question used a word problem format on the PPT, a corresponding word problem was found on the CBT. Both the PPT and the CBT

had flexibility in that students were permitted to skip test problems and return to them, as well as review their answers once they had completed the tests.

Student survey. All students were administered a 16-question survey, the 2017 Computer Access and Familiarity Survey from the National Assessment of Educational Progress, at the beginning of the study (Appendix B). This survey examined the access students have to various electronic devices, including Smart phones, tablets, laptops, and desktops, both at home and at school. It also explored the level of familiarity and comfort students had with technology and the variety of ways in which they interacted with technology for both personal and school use. The survey consisted of multiple choice, yes/no, and Likert scale items. Students were also asked to identify their gender on the survey. The survey was completed in approximately 25 minutes.

Procedures

The four classes that participated in the study were taught by a single 6th grade teacher, with the two co-taught classes having an additional teacher. All students participated in the instructional activities leading up the unit tests, including, but not limited to, direct instruction, individual practice, group practice, and formative assessment. Two of the classes, the co-taught classes, received instruction from the same two teachers. Each student completed the computer access and familiarity survey prior to taking the Unit 5 Test.

All students completed both unit tests. For each unit test, half of the questions were answered using a computer, and half of the questions were answered using a traditional paper-pencil test form. The Unit 5 test covers equations, and the Unit 6 test covers area and volume. The instruction for each of these units took approximately 4 weeks. All of the students received similar instruction and used similar instructional materials for both units. The test for each unit took place over the course of two days and signaled the completion of each 4-week unit. Unit 5 contains 3 standards; Unit 6 contains 3 standards. Each standard was assessed on both the paper-pencil portion and the computer portion using multiple choice, constructed response, and extended response items. This provided a comparison of test mode effect on different question constructs.

Students were placed in one of two conditions, either Condition 1: PPT first/CBT second or Condition 2: CBT first/PPT second. Each condition group contained forty students. In order to ensure equivalency between the two conditions, students were alternately placed in matched groups. These groups were determined based on the students' semester one course averages. The student with the highest course average from semester one was placed in Condition 1, and the student with the second highest course average was placed in Condition 2. This alternate placement of students into Condition 1 and Condition 2 continued until all students were placed.

Condition 1. The forty students in Condition 1 answered test questions from each standard on a paper pencil form and answered an equal number of questions from each standard on a computer based form. These questions included multiple choice, constructed response, and extended response questions. For each question on the PPT, there was a corresponding question on the CBT with a matching depth of knowledge, DOK, value. On the Unit 5 Test, Condition 1 students took the PPT first and the CBT second. On the Unit 6 Test, the order was reversed, so that Condition 1 students took the CBT first and the PPT second.

Condition 2. The forty students in Condition 2 answered test questions from each standard on a paper pencil form and answered an equal number of questions from each standard on a computer based form. These questions included multiple choice, constructed response, and extended response questions. For each question on the PPT, there was a corresponding question on the CBT with a matching depth of knowledge, DOK, value. On the Unit 5 Test, Condition 2 students took the CBT first and the PPT second. On the Unit 6 Test, the order was reversed, so that Condition 2 students took the PPT first and the CBT second.

Results

The purpose of this study was to determine if the testing format, PPT or CBT, had an effect on student performance on mathematical assessments. In order to test this, two unit tests were utilized, with students taking half of each test using PPT and the other half using CBT. The tests' mean scores were then compared.

Unit 5 Test

Prior to running analyses to test the main research questions, it was necessary to determine whether there was an effect from test order. To assess this, two independent samples t-tests were conducted. In the first, condition was the grouping variable and Unit 5 PPT was the dependent variable. Students in Condition 1 took this part first, and those in Condition 2 took it second. In the second independent samples t-test, condition was the grouping variable and Unit 5 CBT was the dependent variable. Students in Condition 2 took this part first, and those in Condition 1 took it second. While the order in which a student took a unit test, and its impact on student

achievement was not a specifically stated research goal, these tests were run to rule out the possibility that order influenced student achievement. There were no significant differences found between groups on either form, Unit 5 PPT p = .158 and Unit 5 CBT p = .374. This indicates that test order had no effect on student performance, as students performed similarly regardless of whether they took a certain form first or second.

The first research question sought to determine if there was a test mode effect on student test performance. To determine if there was a test mode effect, as evidenced by a difference in mean scores between the PPT and CBT, a paired sample t-test was used. Student scores on the Unit 5 PPT were higher, with a mean of 81.04, than on the Unit 5 CBT, with a mean score of 74.81. The mean score difference for the Unit 5 PPT and CBT was found to be statistically significant, $p < .001$. Descriptive and inferential statistic tables are shown below in Tables 1 and 2.

Table 1: Mean Score Difference Unit 5 PPT and CBT

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PPT5	81.04	80	15.724	1.758
	CBT5	74.81	80	18.875	2.110

Table 2: Statistical Significance of Mean Score Difference Unit 5 PPT and CBT

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PPT5 - CBT5	6.225	14.816	1.656	2.928	9.522	3.758	79	.000

The second research question was whether question type, multiple choice, constructed response, or extended response, had an effect on student performance on CBT compared to PPT. To determine this, additional paired sample t-tests were utilized. These tests examined the differences in mean scores for each of the three question constructs. The students had a mean score of 80.74 on the PPT multiple-choice questions in comparison to a mean score of 84.74 on the CBT multiple-choice questions. A statistically significant difference, p = .039, was found for the multiple choice mean score, in favor of the CBT. Descriptive and inferential statistic tables are shown below in Tables 3 and 4.

Table 3: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	MC5PPT	80.74	80	17.394	1.945
	MC5CBT	84.76	80	16.365	1.830

Table 4: Statistical Significance of Mean Score Difference Unit 5 PPT and CBT Multiple Choice

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MC5PPT - MC5CBT	-4.025	17.190	1.922	-7.850	-.200	-2.094	79	.039

The difference in mean scores for the constructed response questions was also statistically significant, $p < .001$; however, in contrast to the multiple choice mean score difference, this was in favor of the PPT. Means and standard deviations are shown below in Tables 5 and 6.

Table 5: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Constru5PPT	88.66	80	18.147	2.029
	Constru5CBT	65.00	80	29.926	3.346

Table 6: Statistical Significance of Mean Score Difference Unit 5 PPT and CBT Constructed Response

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 Constru5PPT - Constru5CBT	23.662	29.747	3.326	17.043	30.282	7.115	79	.000

The third question construct, extended response, resulted in a mean score of 72.19 for PPT and 65.48 for CBT with a difference of 6.71 points in favor of the PPT, but this was not statistically significant $p = .099$.

To address the possibility of gender having an impact on the Unit 5 CBT scores, an independent samples t-test was run. The test resulted in a mean of 75.83 for females and 73.44 for males, with a mean difference of 2.38. This was not statistically significant, $p = .580$.

Finally, a Pearson Correlation was used to determine if a relationship existed between computer familiarity and CBT performance. Computer familiarity was determined by usage, or the amount of time each week a student spent using a computer for school work, including homework, and the frequency with which a student took tests on a computer. For CBT performance and computer usage, no statistically significant relationship was found, with $p = .690$. A correlational analysis of CBT performance and test frequency also resulted in no statistical significance, $p = .706$.

Unit 6 Test

Just as with the Unit 5 test, independent samples t-tests were run to determine whether test order, CBT or PPT first, had an effect on student achievement. Order was not found to produce a significant difference. For the PPT, the mean score difference of Condition 1 and Condition 2 was .25, $p = .941$. For the CBT, the mean score difference of Condition 1 and Condition 2 was 3.5, $p = .437$. This again demonstrated that the order in which a student took the test, PPT first followed by CBT or CBT first followed by PPT, did not have an effect on performance.

To answer the first question of whether a test mode effect existed, as evidenced by a difference in mean scores between the PPT and CBT, a paired samples t-test was used. The mean scores for the Unit 6 PPT and CBT were 80.13 and 77.63, respectively, with a mean difference of 2.5, $p = .224$, indicating there was not a significant difference between the means for the PPT and the CBT.

To address the question of whether question construct had an effect on student performance, additional paired samples t-tests were implemented to determine the mean score differences for each of the three question constructs. In contrast to the Unit 5 multiple-choice mean scores, the mean score of the Unit 6 PPT multiple choice mean was higher, 88.75, than that of the Unit 6 CBT multiple choice, 82.49. A significant difference, $p = .002$, was found for the multiple choice mean score differences, indicating that student performance was greater on PPT constructed response. Tables 7 and 8 show the descriptive and inferential statistics.

Table 7: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	MC6PPT	88.75	80	13.069	1.461
	MC6CBT	82.49	80	19.596	2.191

Table 8: Statistical Significance of Mean Score Difference Unit 6 PPT and CBT Multiple Choice

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 MC6PPT - MC6CBT	6.263	17.056	1.907	2.467	10.058	3.284	79	.002

The mean score for the constructed response questions on the Unit 6 PPT was 80.94, and the mean score for the constructed response questions on the Unit 6 CBT was 80.00, resulting in no significant difference, $p = .831$. Though the mean scores for the extended response had greater variation, 54.56 for the PPT and 62.50 for the CBT, with a mean difference of 7.93, this was not statistically significant, $p = .070$.

To address the research question of gender having an impact on the Unit 6 CBT scores, an independent samples t-test was run. The test resulted in a mean of 77.83 for females and 77.35 for males, with a mean difference of .47. This was not statistically significant, $p = .917$.

The final research question was whether a relationship existed between computer familiarity and CBT performance. Computer familiarity was determined by usage, or the amount of time each week a student spent using a computer for school work, including homework, and the frequency with which a student took tests on a computer. Pearson Correlations were used to test for a relationship between computer familiarity and CBT performance. For CBT performance and computer usage, no significant relationship emerged, with $p = .446$. Similarly, for CBT performance and test frequency, the correlational analysis also revealed no significant relationship, $p = .096$. These findings suggest that computer familiarity, as measured by computer usage and test frequency, did not have an impact on student test performance.

Discussion

This study aimed to determine if a test mode effect existed for student performance on paper pencil tests and computer based tests. The study also sought to determine if the question construct had an effect on student performance on a CBT versus a PPT. Finally, the impact of either gender or computer familiarity in relation to CBT performance was considered.

In regard to the central question of test mode effect, results for overall test mode varied from the Unit 5 test to the Unit 6 test. The difference in mean scores was only found to be statistically significant for the Unit 5 test, in favor of PPT. While this indicates a possible benefit for students taking a traditional paper-pencil mathematics test, the mean score difference for the Unit 6 test did not corroborate this finding. The Unit 5 test, which resulted in a statistically significant mean score difference favoring PPT, tested students on algebraic expressions and equations. The Unit 6 test assessed students on area and volume, a part of the geometry domain. These results are consistent with Logan's (2014) results in which data from sixth grade students' math scores were found to be statistically significant in favor of PPT in the algebra domain, but not the geometry domain. While Keng (2008) posited that higher student achievement on PPT may be due to students' ability to draw on the item or geometric figure, the results of this study were found to be in contrast, as there was no significant difference in PPT and CBT scores on the Unit 6 test that assessed the geometry domain.

The type of question, multiple choice, constructed response, or extended response, was also evaluated for a possible effect on student performance. The mean score differences on the multiple-choice items were statistically significant for both unit tests, with the Unit 5 multiple choice mean favoring the CBT and the Unit 6 multiple choice mean favoring the PPT. The Unit 6 test assessed students on problems from the geometry domain. Keng (2008) posited that the ability to correctly solve geometry problems is made easier with the ability to draw on the shapes on the paper version, as opposed to having to correctly transfer the drawing from a computer based test to paper. The higher score on the Unit 6 PPT multiple choice could be attributed to the students' ability to interact with the geometric shapes on paper. Looking at both tests together, though, the fact that one particular test mode did not consistently yield higher scores for multiple choice questions suggests that multiple choice items are not subject to mode effect. Testing mode, either PPT or CBT, did not consistently give students an advantage on multiple choice items.

Constructed response achievement favored the PPT on the Unit 5 test, but not the Unit 6 test. It has been suggested that due to the limitations imposed by CBTs, students experience increased success on constructed and extended response on PPTs, as PPTs more readily allow students to include pictures or diagrams to support their answers (Bennett et al., 2008). For the Unit 5 Test on equations, students in the study were able to employ a problem-solving strategy for one step equations on the PPT that may have led to increased success as compared to the CBT. While students taking the CBT did have access to scratch paper, it is possible they did not employ the same problem-solving strategy for one step equations because this involved an extra step of transferring from the scratch paper to the computer. Students taking a CBT may consciously make the choice of not going to the effort of using additional material, such as scratch paper, beyond the CBT, or it is possible that they may become so engrossed with the computer itself, that they do not remember to use the scratch paper.

For both Unit 5 and Unit 6, student performance on the CBT and PPT extended response was comparable. Charman's (2014) results indicate that when students are answering extended result essay questions they create longer, more detailed answers on a computer than on paper. This would seem to suggest that scores would have been higher on the CBT, but this was not the case for this study. Though differences did exist in the mean scores for both unit tests, they were not statistically significant. This could be due in part to the large standard deviations or to the limited sample size of only 80 students. Scores may also have been comparable for the PPT and CBT extended response because the very nature of an extended response question allows a student to express their own thought process and support it with details, as opposed to a multiple-choice question which has only one specific answer.

When the impact of gender on CBT scores was considered in this study, no relationship was found to exist. Though this is not consistent with Jeong's (2012) study which resulted in higher test scores for males than females on CBTs, this is consistent with several other studies that have not found an association between gender and CBT performance (Bennett et al., 2008; Lee et al., 2010; Poggio et al., 2005). With gender not having an effect on student CBT performance in this study, and with the fact that this was consistent with previous studies, it is possible that a gender gap no longer exists for computer competency. This may be due to several factors, including the ubiquity of technology in the homes and of computer literacy courses in school.

Results also demonstrated that there was also not a relationship between computer familiarity and CBT scores. Familiarity was determined by student responses on the 2017 National Assessment of Educational Progress Student Survey Questionnaires: Computer Access and Familiarity Study Grade 4. Specifically, familiarity was determined by student computer usage for classwork, including homework, and by the frequency which students had taken computer tests during the current school year. This suggests that while the amount of time a student spends using a computer may vary, it does not have an impact on test performance, as all students had a base level of computer familiarity.

Limitations

Several points can be noted and can be considered limitations to the study. First, the participants in this study came only from one teacher's classroom. Before generalizations can be made, it would be necessary to widen the scope of the classes tested. Other teachers may use computers more or less frequently in their classrooms for daily assignments or for tests, resulting in students having a greater or lesser level of comfort with CBTs. Also, the students in this study are in a school district that has a long history of BYOT, bring your own technology, so the participants had a high level of computer familiarity in an academic setting. This familiarity could vary in other school districts.

Another consideration of the study is the number of each type of question on the unit tests. While both unit tests had six multiple choice questions on both the PPT and CBT, there was only one to two constructed and extended response questions on each test mode. The length of time required for students to fully answer constructed response and extended response questions was the reason for the abbreviated number of these types of question; however, with so few questions, a limited picture of student performance on these question constructs exists.

Future Research/Implications

Despite the limitations, the study resulted in varied student achievement for students on PPT as compared to CBT in two different mathematical domains and question constructs. Although the reasons for this are unclear, these results suggest that further inquiry into test mode effect and question construct effect is warranted. Additional research could also examine the varying requirements for solving problems in the different mathematical domains, such as algebra, geometry, and statistics.

The study's results indicate that gender did not have an impact on student CBT performance, nor did computer familiarity. Future research could examine other possible factors, such as overall student academic achievement, student preference, and student knowledge of and ability to use computer tools, and their possible impact on CBT performance.

Conclusions

Given the integral role of technology in society today, computers as instructional and assessment tools in schools currently are both widely accepted and practical. The benefits of using computers for testing are numerous. Therefore, efforts must be made to ensure student performance on CBTs is an accurate indicator of content competency. The consistent utilization of computers for student classwork and homework will allow the student to be as comfortable with a CBT as with a PPT. Additionally, technological guidance must be provided to

students on the range of tools, such as equation editor, annotation tools, and geometry manipulation, to support student CBT achievement.

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IMPROVISATION IN LEADERSHIP EDUCATION: "MAKING INTERACTIONS WITH OTHERS MORE POSITIVE AND MEANINGFUL"

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ABSTRACT
Improvisation is synonymous with unplanned performances. Paradoxically, successfully engaging in improvisation involves structured underlying techniques. These structured elements have transferable applications to leadership and organizational development. The purpose of this research project is to explore students' experiences engaging in improvisation during a weeklong graduate course. We employed a basic interpretive qualitative approach to examine learners' perceptions around the applications of improvisation tenets and strategies to their professional lives. Results from this study highlighted that the use of the improvisational tenet yes, and motivated participants moving beyond a personal agenda to promote collaboration. Improvisation also facilitated the assessment and mindful adjustment of energy to inspire authentic engagement with others to build trust. Additionally, learners embraced spontaneity to hone their ability to adapt and react in time to change.
Keywords: leadership development, learning and development, improvisation

Introduction

Leaders are expected to have a dynamic impact on organizational culture and inspire employees to drive success for the organization (Goleman, 2000; Leonard, 2017). As a result, there is a growing body of knowledge centered on cultivating effective leaders and relationships across the organizational hierarchy. There is not a singular absolute checklist of attributes one can follow to become an effective leader; however, one's skills in adapting, influencing, and connecting with people represent employee-focused trends in leadership (Allen, 2018; Nelson & Squires, 2017; Yukl, 2013). The literature revealed several recommendations to support building authentic employee relationships, such as cultivating skills around empathy, mindfulness, and interpersonal awareness (Gandolfi & Stone, 2018; Goleman, 2000). These recommendations emerged as a way to support leaders in managing oneself, employees, and other stakeholders.

This study explores student learning in a graduate business course focused on aligning improvisational strategies and leadership skills. Improvisation and improv are similar terms used interchangeably in this project. Much of the contemporary understanding around improv associates it with spontaneity; in fact, the art of improvisation involves performance without planning (Zaunbrecher, 2011). So, how does spontaneous theater assist in developing leaders in business?

Even though performances are spontaneous, successful improvisation involves structured underlying techniques and strategies. For example, improv shows often begin with a group of improvisers receiving a prompt from the audience. The performance ensemble accepts the information shared and organically builds on that prompt; furthermore, they expand on the contributions each member provides to construct a performance. For the individual performers to come together and create a cohesive show from nothing other than a prompt, it requires members to possess honed skills in suspending judgment, active listening, open communication, energy manipulation, adaptability, and team building (Salinsky & Frances-White, 2017). Several effective leadership practices encompass similar abilities (Gandolfi & Stone, 2018; Goleman, 2000; Nelson & Squires, 2017) and focus on the importance of authentic connections with employees (Paxton & Van Stralen, 2015). Additionally, these skills, when executed well, contribute to assisting with cultivating an innovative organizational culture (Crossan, 1997).

The merging of business principles and improvisational tenets and approaches represents an expanding area in practitioner literature and research (Bernard & Short, 2012; Koppett, 2013; Kulhan & Crisafulli, 2017; Leonard & Yorton, 2015; Vera & Crossan, 2005). The purpose of this research project is to explore a merging of these two worlds by examining students' experiences at Duke University's Workshop in Managerial Improvisation. More narrowly, the examined learners' experiences include their perceptions around the engagement in improv

exercises and the potential applications of improv tenets and strategies to their professional life. The knowledge gained in this study may prove valuable to organizational leaders, company training and development departments, instructional designers in business programs, and improv facilitators. Through a basic interpretive qualitative approach, we sought to answer the following research questions: 1. What are the experiences of learners in the Workshop in Managerial Improvisation course? and 2. According to participants, what function do they believe improvisation will serve in their professional life?

Understanding Leadership

To understand the applications of improv in grooming professionals in business, it is important first to understand the meaning of leadership and address leadership strategies. Leadership, as a concept, is a broad topic with varied methods of execution and styles. The approaches vary in purpose, short- and long-term outcomes, and across sources. As such, it becomes necessary to narrow the focus for discussion and provide the definition of leadership.

This article embraces the understanding that "Leadership is taking responsibility for getting results through the efforts of others" (Leonard, 2017, p. 245). Johnson (1976) echoes this in his seminal article, highlighting the main objective in developing employees is to drive performance. With this understanding as to the broad purpose of leadership, a delve into deeper aspects of this role can focus on methods of enacting leadership, aspects of successful leadership, and common traits of an effective, employee-focused leader.

The Evolving Understanding Around What is Effective Leadership

Several leadership theories exist, but there is no singular agreed-upon approach (Allen, 2018; Nelson & Squires, 2017). Trait-based, behavioralist, competency-based, situational, transformational, transactional, and other theories represent past trends in leadership and organizational development (Nelson & Squires, 2017). A popular method for determining successful leadership is to reverse engineer leaders by examining those leaders who achieved their goals time and again. The idea behind this behavior is to find an index of attributes that all successful leaders possess to discover those that are trainable. The discovery of these attributes allows for the development of a model to train them with the goal that this will lead to developing great effective leaders (Leonard, 2017).

Organizations look to leaders to possess desired traits, behave in certain manners, and even possess specific skills, all in an attempt to find the cross-section of attributes for these qualities that comprise a successful leader (Nelson and Squires, 2017). As a result of the research surrounding this topic, Nelson and Squires (2017) provided a landscape of researched leadership approaches. They reviewed how researchers sought to source specific leadership attributes to define the most successful collection of attributes or style of leadership. They concluded that no one style or collection of traits had been shown to work across all circumstances; furthermore, they conclude that being adaptive as a leader tends to allow for the adoption of traits needed at the moment to best serve the organization (Nelson & Squires, 2017).

Understanding how to cultivate effective leaders is an evolving phenomenon that is situation-based. Along with adaptive approaches (Nelson & Squires, 2017), social and influencing skills emerged as important elements in the literature (Allen, 2018; Paxton & Van Stralen, 2015; Yukl, 2013). As such, this section explores some trends surrounding cultivating adaptive and employee-centered, influential leaders.

Approaches to Effective Leadership

One may adopt a variety of approaches when leading a group of employees from one-directional conversations with instructions, desires, and consequences to open dialogue where communication flows both to and from the leader. As with any approach to varied and encompassing tasks, some approaches are more effective than others for sustainable success. For example, only dictating what needs to be done or setting intense fast-paced and high-performance standards may work under specific circumstances (Goleman, 2000; Paxton & Van Stralen, 2015); however, employees may feel disconnected in this type of organizational culture (Jones, Davis, & Thomas, 2015). Even transactional leader-to-employee relationships, which distribute rewards in exchange for good performance, are found to be more effective in the short-term rather than long-term (Curtis, 2018; Nelson & Squires, 2017). These approaches can be seen in individualist and competitive environments or with leaders trying to redirect an underperforming company, but as Jones et al. (2015) found, employees, especially those developing skills, may be overwhelmed and disengaged in competitive settings. These approaches typically adopt a linear form of communication with edicts and instructions coming from the top-down and lacking authentic interpersonal connections (Goleman, 2000).

Rather than solely commanding actions and results, effective leaders adapt to meet the needs of the team or environment (Goleman, Boyatzis, & McKee, 2013; Nelson & Squires, 2017). Visionary leaders or authoritative leaders also represent a reasonably linear approach; however, they consider an employee's motivations and inspire them toward a common goal (Goleman, 2000). Other more inclusive, less linear approaches encourage a leader to spend time getting to know individuals on his or her team. These leaders display secure attachment by being warm and empowering employees; additionally, they cultivate synergy between team members (Paxton & Van Stralen, 2015; Underwood, Mohr, & Ross, 2016).

Another leadership approach that stimulates innovation toward a shared vision is transformational leadership; however, leaders embracing this style motivate and encourage employees at an individual level (Curtis, 2018; Nelson & Squires, 2017; Underwood et al., 2016). Underwood et al. (2016) considered the relationship between transformational leadership and attachment styles, and their findings mirror related research that highlights the effectiveness of transformational leaders with secure attachment styles. They found that transformational leaders with secure attachment are confident in their abilities and cultivate trust with their employees.

Affiliative leaders connect people and encourage inclusion to resolve conflict. A leader may also consider employees' perspectives and approaches when developing the organization and their people (Goleman et al., 2013), which represents a more democratic approach. To develop employees and foster company talent, leaders may also assume a coaching style where they connect personal and organizational goals (Goleman, 2000). The servant-leader role represents a more inclusive and collaborative approach that involves adopting the behavior of thinking of one's employee first (Gandolfi & Stone, 2018).

A focus on people is at the core of these non-linear approaches. Leaders employing these roles possess social skills in empathetic and active listening. They are personally mindful and possess interpersonal awareness of how others receive them. They embrace these employee-focused approaches while developing with the employee to achieve desired organizational outcomes (Gandolfi & Stone, 2018; Goleman, 2000; Goleman et al., 2013; Lind & Sitkin, 2007).

In driving business objectives, leaders also employ various influential tactics. Tactics that appear to be less employee-centered, such as exerting authority, applying pressure, using others to influence, may result in obedience but be counterproductive in the long-term (Curtis, 2018; Yukl, 2013). A leader may attempt to influence an employee through legitimacy, which involves exerting authority to move in a direction; however, an absence of established credibility can be deconstructive (Maister, Green, & Galford, 2000; Yukl, 2013). When a leader establishes an objective for an employee, the leader may micro-manage the execution and threaten the employee with punishment should the employee not meet the outcomes; this approach can also be counterproductive. A leader may use coalition tactics by recruiting others to influence an employee toward a performance objective (Yukl, 2013), which is the opposite of building authentic relationships and establishing intimacy between members (Maister et al., 2000).

In contrast, rational persuasion, inspirational appeals, consultation, and collaboration were found to be the most effective influence tactics for a leader in obtaining support on an initiative (Yukl, 2013). A leader who has established credibility with an employee may employ rational persuasion to drive an objective; this involves providing data-driven information to get support from an employee. A leader who understands an employee's needs and values may appeal to those to get them to perform in a particular way. Commonly referred to as inspirational appeal, this is a more emotionally driven tactic. A leader may employ consultation, which involves including an employee in the development and execution of a project to obtain support and drive completion. A leader may offer to collaborate to drive results; this involves working together toward a target (Yukl, 2013). Cutis (2018) found, "… three of the four core influence tactics (rational persuasion, inspirational appeals, and consultation) plus apprising best aligned with transformational leadership…" (p. 11). Appraisal refers to a leader who knows an employee's needs and goals and highlights what is in it for the employee to influence them in a direction (Yukl, 2013). Collaboration aligned most with transactional leadership (Cutis, 2018).

Employee-Focused Leadership

Employee-focused leaders may be more in sync with employees to better influence their employees. Leaders are cognizant of their behaviors to assess when to maintain or adjust approaches to meet the needs of their followers (Gandolfi & Stone, 2018; Lind & Sitkin, 2007). This type of self-awareness impacts in-time decision making. One method for employee-focused leadership is to postpone judgment to assess a given situation thoroughly. Though leaders suspend judgment, that does not mean they abandoned it. They are open and understanding of the verbal and non-verbal information provided by employees. Here a leader self-manages to thoughtfully consider the information provided and assess how he or she affects others and the organizational goals. They

may not act on every piece of information shared, and the key component here is seeking true understanding, so employees feel represented (Lind & Sitkin, 2007). Social-awareness and empathy among team members and leadership motivate rapport and trust as leaders become aware of how behaviors influence others (Goleman et al., 2013).

The path taken by effective leaders to achieve organizational goals bears reviewing as this involves capitalizing on the skills and knowledge of a workforce. Considering business is rarely straightforward and consistent, a leader's roles are to provide guidance to followers and drive performance objectives within an ever-changing environment (Johnson, 1976; Leonard, 2017). As discussed, though documented trends exist, no one single style of leadership or collection of traits succeeds in every situation. Each situation and each employee are different and require a variety of everchanging interactions to achieve potential (Nelson & Squires, 2017). The social, influencer, and adaptability skills discussed in the literature infer that leaders need to be flexible enough to assess a situation, connect with different employees, and relate the organizational vision (Allen, 2018; Nelson & Squires, 2017; Paxton & Van Stralen, 2015; Yukl, 2013). These skills and attributes align with improvisational tenets and approaches. The application of improvisational tenets appears to be a resource to cultivate adaptability and interpersonal communication skills.

Applications of Improv in the Workplace and Business Curricula

The applications of improv in the workplace center on the value of incorporating improv tenets and exercises (Bernard & Short, 2012; Crossan, 1997; Koppett, 2013; Kulhan & Crisafulli, 2017, Leonard & Yorton, 2015). Bernard and Short (2012) worked with employees on the tenets of listening, team building, interpersonal communication, and status work. Koppett (2013) outlined improv principles that apply in business, such as "trust, spontaneity, accepting offers, [and] listening and awareness" (p. 6). Many of the improv concepts applied to organizational development, identified by Bernard and Short (2012), are included in Koppett's (2013) skills.

The above list includes trust, yet trust is a large part of all the other tenets. It is important to understand the components of trust to appreciate the development of effective relationships in improv and the workplace. Maister et al. (2000) and Koppett (2013) explained that one's credibility influences trust between members. Credibility refers to the competency needed for quality results (Koppett, 2013; Maister et al., 2000); Maister et al. (2000) further clarified that credibility also happens when someone believes in another person. Another component involved in one believing in another person includes whether that person is reliable. Intimacy is important between members, and this represents the strength of the social connection between members and being able to open up and to communicate honestly with one another. Also, to enhance social connection, one's social orientation needs to center on the other person. All of this promotes social support (Koppett, 2013; Maister et al., 2000) achieved through respectful authentic communication (Paxton & Van Stralen, 2015).

Effective communication involves active listening and contributing to the information received. Koppett (2013) discussed "Accepting offers" (p. 45) as well as "listening and awareness" (p. 63), both of which represent the embodiment of the core improv philosophy yes, and. Yes, and involves actively listening to group members, then adding to their contributions to construct a scene (Halpern, Close, and Johnson, 1994) or move a dialog forward (Koppett, 2013). Koppett (2013) explained, in training teams to listen, one must move beyond the initial acknowledgment of information. To truly listen, one must hear beyond what someone verbally and nonverbally shared. Improv skills help make individuals more attuned to physical reactions and to mental responses in addition to honing an ability to adjust communication with team members from followers to upper management (Koppett, 2013). The goal is to try to understand the reasoning behind the communication so one can assess the accuracy of comprehension and then appropriately add to the dialog.

Trust and effective communication support spontaneity in improv and organizational development, and spontaneity is the deliberate engagement in unplanned activities (Zaunbrecher, 2011). To facilitate spontaneity in business, which fosters creativity and innovation (Koppett, 2013), one must feel safe to develop and share ideas.

At a one-on-one employee and organizational level, all these skills hold value (Crossan & Sorrenti, 1997). Duke University (2014) highlights some similar topics and areas of examination discussed by Bernard and Short (2012) and Koppett (2013). Duhart (2014) echoes these topics in the following course description: "573. Workshop in Managerial Improvisation. Effective improvisation entails active listening, teamwork, risk-taking, adaptability, spontaneity, focus, intuitive decision making, rapid problem solving, and the ability to keep a cool head in a crisis" (pp. 77-78).

In 2000, Duke University was the first university in the United States to offer college credit for a course aligning improv to business. Since then, a number of schools have incorporated improv into business curriculums as a

non-credited standard, such as UCLA Anderson School of Management; Columbia University Business School; University of Florida, Hough Graduate School of Business; UMass Amherst, Isenberg School of Management; Arizona Thunderbird School of Global Management; Indiana University, Kelly School of Business; University of South Carolina Moore School of Business, and Yale School of Management. The literature surrounding the integration of improv in higher education business curricula represents an emerging area (Aylesworth, 2008; Huffaker & West, 2005; Kulhan & Crisafulli, 2017). The growing applications provides an opportunity to examine the uses of improv in business. This study centers on one area within business education, and that is the role improvisation can play in developing up-and-coming business professionals.

Research Design

Considering this study examines and describes learners' meaning-making and applications of content from a weeklong course titled Workshop in Managerial Improvisation, we employed a basic interpretive qualitative approach. Aligning with constructivism, which centers on how individuals develop understanding through internal and social experiences (Carlson & Wiedl, 2013; Vygotsky, 1993), a basic interpretive qualitative approach is "…interested in (see Appendix A) how people interpret their experiences, (see Appendix B) how they construct their worlds, and (see Appendix C) what meaning they attribute to their experiences" (Merriam & Tisdell, 2016, p. 24). In embracing a basic interpretive qualitative approach, this research employs several forms of data (Merriam & Tisdell, 2016), such as participant observations, reflective writings, and course materials.

Data Collection and Participants

Data collection took place from January 11-29, 2016. We examined participants in the Workshop in Managerial Improvisation at Duke University because the program is well-established in educating learners around using improv skills to enhance leadership effectiveness. Duke University (2017) includes over 21,000 alumni and enrolls approximately 950 students a year. These learners center their studies in various areas of domestic and international business administration, management, and analytics.

The weeklong intensive from January 11-15, titled the Workshop in Managerial Improvisation, began before learners and facilitators meet. Learners reviewed literature centering on leadership and organizational development and improvisation in business. The intensive involved four and a half all-day classes, an evening performance called a JAM session, and a capstone performance at the end of day five. The students were also required to respond to three writing prompts. Class sessions centered on creating a culture of acceptance for engagement in improv exercises and reflective discussions. The JAM session provided learners an opportunity to perform improv before the capstone. The capstone performance culminated the development with learners in a large auditorium, now in front of an audience consisting of classmates, families, friends, and Duke University staff and faculty.

We completed the Institutional Review Board process, and we sought a purposeful sample due to the in-time examination of students' in the 573. Workshop in Managerial Improvisation. The subject populations included one hundred and twenty Duke University students. On the first day of class, all students in the course were asked to participate in the study. We informed the learners that this was completely voluntary and that they were in no way obligated to participate in the study to participate in the course.

Additionally, we informed them that in completing the writing assignments, they could refuse to have their responses to any or all prompts included in the study by noting this in their writings. Participation or non-participation in the study did not affect learners' experiences, grades, or credits in the course. We did not access data from student writings until after the posting of grades. Nineteen students either did not agree to participate or did not submit a consent form. One hundred and one students consented to be in the study. Researchers removed participant identifiers from the data and assigned pseudonyms.

The Duke University staff randomly divided the students into groups; participant observations and the review of writings focused on one group of twelve learners' experiences during class sessions. Participant observations involved students engaging in a variety of exercises, discussions, debriefs, and demonstrations of learning. Observational field notes documented the experiences, and one of the researchers produced memos following the events. Learners completed reflective writings developed from prompts. Participants engaged in daily reflective journals (Appendix A) following each session from January 11-15; additionally, learners submitted an experiential learning journal (Appendix B) and a strategic memo (Appendix C) by January 29. The experiential learning journal and strategic memo provided them the opportunity to reflect on past experiences and consider future applications of learnings to their practices. In sum, we conducted observations on twelve participants, and we collected responses to the writing prompts from one hundred and one participants.

Analysis and Trustworthiness

Data analysis primarily centered on the participant observations and writing prompt responses of twelve learners' experiences. However, to further inform the understanding of student learning in the course, the researchers analyzed the additional 89 participant responses to the writing prompts. Following the initial data collection, posting of grades, and immersion into the data, researchers conducted several rounds of open coding.

The open coding led to the identification of several core concepts, such as using yes, and, the identification of individual agenda, promoting collaboration, the mindful adjustments of actions, moving toward authentic engagement, embracing spontaneity or the unknown, striving to adapt and react, and others. Open coding included dividing and reorganizing data into major descriptive parts. Codes were then examined thematically across cases and categories to capture participants' understanding of engaging in improv and transferring improv applications to their practices. Focused coding was employed to get to the core thematic patterns (Saldana, 2016). Three themes emerged: 1. the improvisational tenet yes, and motivated participants moving beyond a personal agenda to promote collaboration, 2. improvisation facilitated the assessment and mindful adjustment of energy to inspire authentic engagement with others to build trust, and 3. learners embraced spontaneity to hone the ability to adapt and react in time to change.

The researchers' role includes the understanding of positionality (Merriam, 2009; Merriam et al., 2001; Simon, n.d.) to determine insider or outsider status. We considered the researcher as a device to gather information in a study (Simon, n.d., p. 1). The authors acknowledge deep immersion in the improv performance and practitioner communities. One author began studying improvisation in 2003-2004. The other author began studying improv in 1994, and at the time of the program had over twenty-one years of experience teaching, producing, and performing improvisation internationally. He co-created the academic course, is the on-site lead, and is a facilitator in the Workshop in Managerial Improvisation; additionally, he also represents a researcher, author, and subject.

The researchers' involvement holds value because it provided access to the site and participants (Merriam, 2009; Merriam et al., 2001). However, it is also important to note that researcher bias could influence the study. To minimize this threat, we used multiple sources of data and immersion in the field (Merriam, 2009; Merriam et al., 2001). We also employed outside auditors and developed an audit trail (Lincoln & Guba, 1985).

Findings

Some learners discussed entering the Workshop in Managerial Improvisation course skeptical about improv's applications in business. A few remained uncertain about the uses of improv in environments that are not constructed to embrace the underlying tenets, such as yes, and, collaboration, and learning through failure. However, learners quickly began to consider future applications of improv in their careers. For example, Keith (pseudonyms were assigned for all participants) stated,

> Full disclosure, when I entered the workshop, I was a bit skeptical in terms of the usefulness and effectiveness of improvisational skills. All I believed was involved in improvisation was thinking creatively and trying to be humorous. Boy, was I wrong!

Brent also echoed this sentiment and further explained,

> I expected the class to be focused on humor and becoming a good improviser... However, I now understand and value the class to be a focused effort at generating self-awareness in terms of energy, message delivery, and message receipt all in the vein of building emotional intelligence (EI) so as to become more effective and efficient communicators.

By the end of the course, the majority of learners richly forecasted the applications of improv tenets and approaches in business. Furthermore, though not a focus in this study, learners also strategically elaborated on improv's uses in finishing their program of study and in their personal life.

The findings addressed the research questions by capturing the learners' experiences and perceptions around the potential application of improv tenets, strategies, and exercises to their professional life. The major themes included: 1. yes, and motivated moving beyond a personal agenda to promote collaboration, 2. improv facilitated the assessment and mindful adjustment of energy to inspire authentic engagement to build trust, and 3. learners embraced spontaneity to hone their ability to adapt and react in time to change.

Yes, And Motivated Moving Beyond a Personal Agenda to Promote Collaboration

Learners discussed how using yes, and in conversations facilitated moving beyond one's agenda to promote collaboration. Students became deeply aware of how often individuals negate information. Shan explained,

> I realized how easy it was to say yes, but instead of yes, and. When I use yes, but, I simply put forth my opinion and not listen and embrace the other person's idea. It is easy to prepare my agenda and say the same thing regardless of the other person's response. Nevertheless, yes, but does not help to build up ideas and promote collaboration.

This powerful realization for learners motivated them to be mindful of how often they reply to others with no or yes, but. Together these two words undermine rapport, team building, and productivity. In this context, replying with yes unauthentically acknowledges what the other party shared and the use of but disregards the contributions. The reply of yes represents a formality of recognition. The receiving party was not truly open to the information provided. Instead, they were focused on their agenda and mentally framing a reply, which undermines the authenticity of the yes.

Moving beyond focusing on one's agenda can be a challenging undertaking. The American business culture centers on individualism and competition (Crossan, 1998). Anton shared an area of growth for him in the course was "…learning how to walk away from competitive energy towards collaboration energy." Some learners expressed challenges with relinquishing control for the overall benefit of the team and organization. Robin explained this struggle by sharing that she had "…trouble delegating in the past (especially when I think my ideas/execution will be great), so working on being open, letting go of control, and brainstorming with others was very beneficial for me."

Engaging in improv assisted learners in being present and open to receiving information; more narrowly, yes, and promotes active listening and contributing information on what others provide (Halpern et al., 1994). One must slow communication and focus on presence. Multiple times during the course, learners engaged in yes, and conversations while being challenged to apply yes, and throughout course activities. Arrav explained, "The most important thing that stood out for me during the improvisation workshop was accepting the gifts given by the team and then molding them into something that adds to the overall value or meaning." Learners found that these exchanges led to deeper, more meaningful dialogs inside and outside the course context. John spoke of this shift in understanding:

> At school, we are taught that the diversity of perspectives leads to better ideas and outcomes. Many, including myself, have taken that to mean we must challenge each other's ideas rather than build them up. The course, however, has taught me that the opposite is often true. Building off each other's' ideas drives stronger collaboration and better outcomes.

Learners engaged in improvisational exercises that promoted development as a collective. Tom reflected on some past work experiences,

> I frequently saw situations where improvisational skills were neglected. During most brainstorming or creativity-related meetings, I noticed the presence of negativity and constant convergent thinking. Ideas were often shot down, and many employees were driven by individual agendas.

Individualist and competitive environments can result in disengaged employees (Jones et al., 2015). Tom realized the distinct contrast between his past work environments and the improv course; he concluded that those workplaces "… most likely led to poor idea generation and contributed to a negative environment across the firm."

Similarly, a director role in improvisational performance is, "The group trumps the individual" (Ronen, 2005, p. 111). Protecting the team and their larger objective is imperative, and the learners developed skills in creating more than an individual agenda. Leaders have an agenda to drive results (Leonard, 2017); however, the ones with secure attachment that connect with employees at an individual level working toward a shared vision are more effective (Curtis, 2018; Nelson & Squires, 2017; Underwood et al., 2016).

Yes, and does not mean consenting to every idea, concept, or argument. Rather, this approach is a device for understanding, creating an open dialogue, and engaging in thoughtful, respectful disagreements. Even if an idea is not used, waiting to place judgment to consider an employee's contribution and analyzing the complexity of a situation, demonstrates to others that they are valued and part of organizational culture (Lind & Sitkin, 2007). Additionally, instant negating and dismissal can lead to the rejection of an innovate idea or a concept one can cultivate into something great (Crossan & Sorrenti, 1997).

Moving beyond linear communication and being open to more employee-focused methods creates inclusion. Yes, and techniques appear to underlie aspects of transformational, affiliative, democratic, coaching, and servant leadership approaches (Gandolfi & Stone, 2018; Goleman, 2000; Goleman et al., 2013; Nelson & Squires, 2017).

Learners truly embodying the yes, and philosophy understand that it involves not only saying the terms; it is also about truly giving another person their full attention and committing to understanding what the other person is sharing on their terms. Then contributing to show support and moving the dialog forward. After Anton discussed planning to incorporate yes, and into his career, he shared the importance of moving beyond yes, and being buzzwords. He explained striving for the:

> … mechanical elimination of yes, and from my speech would be helpful too. This way, I will be able to build bridges between the thoughts of people in conversation. [And,] this way we in my teams we will be able [to] generate products of collective, not individual thinking.

Anton addressed moving beyond using yes, and superficially and truly embodying the underlying tenets of "listening and awareness" (Koppett, 2013, p. 63) and “accepting offers” (Koppett, 2013, p. 45) to enhance collaboration and support.

Building upon the challenges of authentically adopting yes, and in the course, some participants reflected on challenges in potentially applying this into their daily corporate work. For example, Keith shared, “Individual/team members I interacted with were not of the same mindset. For example, there were several instances in meetings where ‘yes but’ was constantly used.” Even though yes, and can assist in instilling trust within a group (Maister et al., 2000), it can be a significant cultural shift for an organization that operates less collectively (Crossan, 1998). Keith further explained how he will need to be an agent of change at his company and how his daily interaction “…taught me to just be patient and understand that all lessons were not going to implement perfectly.”

Improv Facilitated the Assessment and Mindful Adjustment of Energy to Inspire Authentic Engagement and Build Trust

Yes, and prompted learners to be aware and open to others’ contributions. Learners also shared that engaging in improvisation motivated internal mindfulness on personal energy and actions. Arrav explained engaging in improv in the course, “… it required us to be aware of ourselves and the surroundings.” Learners honed skills of being deeply in tune with how others received their verbal and non-verbal contributions. They then developed skills around consciously transferring energy and connecting behaviors to impact team objectives positively.

Learners addressed becoming thoughtfully aware of the words they used and the body language they communicated during improv exercises. They further expressed how the assessment and adjustments of their energy could impact individual and group relationships. Tom explained the application of these skills to his job, “I felt that just by being conscious of what I was saying, I was able to deliver my feedback more positively overall.” Lauren summarized her learning and addressed how she perceived improvisational skills would influence her future work.

> I think that this course helped us to become more aware of our environment and ourselves. Several of the exercises helped us to understand how small changes in our body language, tone of voice, and vocabulary can have a large impact.

Effective leaders adapt their style to motivate, engage, and develop their people toward a common vision (Curtis, 2018; Goleman et al., 2013; Nelson & Squires, 2017).

Participants explored the intensity and direction when adapting energy. They spoke of the positives of heightening and focusing energy when working with others. They explained that positive, heightened energy demonstrates passion, commitment, and enthusiasm. It also motivates others to exhibit similar responses. However, a note of import is that mindfully adjusting one’s energy, can be poorly received. Anton highlighted past experiences that exemplify the need for strategic, mindful adjustments; “... my vision of high energy may be sometimes mistakenly associated with loud chat, expression, and active physicality.” He further emphasized that “… high energy may be sometimes harmful for productive teamwork.” The goal here is to mindfully control the direction and intensity of one’s energy as a group requires to guide the direction of the project.

Learners developed skills in self and social awareness and how to focus energy on authentic engagements. Keith explained, “I learned that just being natural and authentic in all interactions was extremely important.” Improvisation is a communication-based art that forces one to be present and in the moment. Julie explained, “I recognize the importance of improvisation to making interactions with others more positive and meaningful, finding opportunities to build upon others’ thoughts, and being ‘present’ in my interactions with others.” To authentically respond to somebody, one must be mindful of one’s mental and emotional state while processing the conversation from the other participant. One should not lose focus of the present thinking about what needs

doing in the future or what one should have been doing in the past. Karen shared in the past

> Sometimes I would have checked out of a conversation because it was a person's opinion I did not value as much, because my mind was on a different subject matter, or most often because I was more focused on executing the delivery of my own ideas.

In building relationships with people in improv, the workplace, or other areas of life, one has to be right here, linked to the people in the communication. Karen further discussed her learning around being intentionally present,

> Ultimately, I have to make a choice to actively listen, as it is not something that I do naturally. It is so easy to get lost in one's own thoughts and ideas but listening and responding to others requires a conscious decision and unconditional acceptance and acknowledgment.

Crossan and Sorrenti (1997) explained that for an organization to incorporate improv into a culture, employees and the company must be supportive, be engaged, and be receptive to trying unconventional approaches. The course preparation materials outlined course cultural parameters before the course began, and the learners wrote in-depth about coming together as relative strangers, quickly developing deep connections, and building trust and community through engaging in activities. They reported bonding by lowering social barriers and engaging others in improv exercises.

Engagement in improv, such as yes, and conversations, mirroring each other's non-verbal motions, and assuming characters slightly outside of oneself took most out of their regular behavior and conversational styles. Lian explained, "I found myself constantly out of my comfort zone because being goofy or talking about being an 'underwater mammoth scientist' [an observed role played during an exercise] does not come naturally." Some noted that they were initially afraid to engage in the activities. The group bonded because they realized others were also being vulnerable, and they concluded they were there to support one another, and everyone "looked silly together."

When a group engaged in work that risks them looking odd and the individuals in the group feared other peoples' perceptions, the engagement resulted in enhanced intimacy in the group, and it instilled trust between members (Koppett, 2013; Maister et al., 2000). Learners reflected on transferring these processes to their current and future places of work. Robin noted, "I'm a firm believer in being authentic and bringing one's whole self to work." Learners shared how authentically engaging will bring more intentional positive exchanges and create a space where team members are open to share ideas and support one another. Robin continued by explaining, "the most beloved and influential leaders are actually those who strive for authenticity and aren't afraid to be vulnerable."

Cultivating an internal presence that actively focuses attention toward authentically communicating with the person one is engaging with enhances trust (Maister et al., 2000). Strong leaders meet an employee where they are and "…drive emotions of those they lead in the right direction" (Goleman et al., 2013, p. 6). The participants learned to create an environment where the barriers to communication and collaboration are eliminated and replaced with open and honest exchanges. A leader can more effectively understand an employee's needs, goals, motivators, and values when barriers are not present; in response, this information can then assist in influencing an employee toward a performance objective (Yukl, 2013). The primary consideration of one's employees can be a useful leadership strategy. The servant-leader literature echoes this idea (Gandolfi & Stone, 2018). Mindfully adjusting to focus on building trust and authentic support for one another represents a critical component of organizational collaboration and innovation (Gandolfi & Stone, 2018; Paxton & Van Stralen, 2015).

Embracing Spontaneity Honed the Ability to Adapt and React in Time to Change

To facilitate spontaneity in business, one must feel safe to develop and share ideas (Koppett, 2013). Once the organization establishes the foundation of support and trust, individuals can embrace spontaneity. Learners participated in guided activities in which they were required to respond to ever-changing prompts. In response, the learners discussed the importance of being able to adapt and react in-time in the workplace. Keith explained, "Reacting and adapting is constantly used in my professional life." He reflected that being flexible represented a critical attribute to success as a consultant to Fortune 500 companies. He reflected on times where he worked with leaders where their needs "…were constantly changing based on market and business conditions. Being able to adjust to their needs and provide the correct strategy was crucial." Nelson and Squires (2017) argued that even though there are numerous leadership approaches one may assume, being able to adapt as a leader best serves employees and the organization.

Businesses exist in chaotic, volatile, and unpredictable conditions (Crossan, White, Lane, & Klus, 1996). Cheng shared, "New technologies are constantly emerging at every corner and assert [a] disruptive effect to traditional business models." Businesses experience more difficult times in the present day with consistent advancements in technology and economic changes (Akdere & Conceicao, 2006; Crossan, 1997). Leonard (2017) expounds on the benefits of full back-and-forth conversation in leadership, eschewing the one-directional method of leadership from leader to follower. Researchers examining the business curriculum also noted that the corporate world is not linear, and every decision cannot be strategically planned (Cherlariu, Johnston, & Young, 2002; Crossan et al., 1996). However, the majority of business curriculums, such as marketing (Cherlariu et al., 2002) and leadership-development programs are linear.

Beyond solely higher education, Ishaan shared "formal education is teaching not to be creative/spontaneous." Moreover, most of the early education programs include prefabricated curriculums that limit creativity (Sawyer, 2004). Matt reflected on this realization, "I remember how angry a teacher got at me when I told her I thought it was really odd that the textbook made us learn fraction [and] multiplication in a certain way." He further shared that "teachers would get furious with me" when he did not follow a specific process. Matt emphasized, "I wish I'd been stubborn enough to keep more of my artistic and creative tendencies;" he further explained that this made him ridged and "made it harder to uncover similarities with people and get people to like me." Instead of a formulaic approach to grooming business professionals and leaders, Leonard (2017) recommends using conversational tools to teach the desired traits of leadership. Through debriefs, skills practice, and immediate feedback, leaders can acquire information from followers while simultaneously disseminating information to the followers. It is through these two-way conversations that participants add to the overall knowledge base to better adjust (Nelson & Squires, 2017) and serve (Gandolfi & Stone, 2018) the followers developing into a successful leader (Leonard, 2017).

Beyond the classroom, to address the ever-changing world of business, Cheng further shared, "The ability to respond, adapt, and evolve fast are key to remaining competitive." The learners discussed the importance of honing the ability to adapt and react in the workplace and how one can use improv to support this ability. Anton shared:

> During the improv course, I discovered that creativity and innovation are dependent on the freedom of mind, i.e. on free and instantaneous flow of ideas. In business, we are taught that bright idea[s] should be a result of thorough preparatory work; however, [the] improv course demonstrated how creative people can be by unlocking their personality and generating spontaneous ideas.

Weick and Quinn's (1999) found that, even when a company strategically plans, it does not guarantee desired results. The continuous organizational change represents a constant process of revisiting and adapting. In this frame, improvisational elements present an intervention where members influence change (Orlikowski, 1996; Vera & Crossan, 2004). A core philosophy of improv involves embracing new information and change quickly (Bernard & Short, 2012). Celio concluded, "…It is all about reacting, adapting, and communicating. If you ace these three steps by applying improvisational skills, you will gain trust and succeed in your personal and professional life."

The core of the course centered on participants learning to be present within the moment, accepting information presented, reacting, adapting, and responding in real-time. Learners engaged in exercises that aligned with improv techniques employed in business curricula and the workplace. The exercises included short-form games lasting 2 to 7 minutes that represented self-contained exercises performed in improv comedy theatres. The facilitators used these short-form games in combination with real-world and scenario-based exercises. This practice echoed other uses of improv in business curriculum to create a context of experiential learning (Huffaker & West, 2005). Focused debriefs and informal reflective dialogs challenged learners to employ and connect improv tenets to professional situations. These approaches replaced traditional frames of discussions (Aylesworth, 2008; Huffaker & West, 2005). Cheng reflected on the application of improv, "in real business meetings with clients and partners, negotiations can get tough, and we may be asked unprepared questions, the improvisation skills we practiced in this class really prepared us well to these kinds of unknown situations." One cannot strategically plan for every question or situation. Cheng further explained,

> In my last position…, we had a hierarchal approval procedure because of heavy regulatory hurdle and were used to take [the] conservative solution. This culture slowed down the decision-making process. There were a couple of times when we lost contracts to competitors because we were not able to address [the] client's concerns in a timely manner.

Improv hones the ability to accept new information and adapt and react timely (Ronen, 2005). Employees can engage in structured "what if" scenarios which facilitate exploring numerous possibilities to gauge potential

benefits and disadvantage (Crossan, 1997). Cheng concluded from her experience, “If we had incorporated improvisational skills, we should have had cooperated better within the team to manage client's expectation, be adaptive while not deviating from the company's business norm, instead of blindly waiting for the green light from senior management.”

The inability to adapt can lead to loss of business or an organization not responding to industry change. Many businesses fail due to an inability to adapt and change (Crossan et al., 1996). Blockbuster, Kodak, Toys R Us, and Radio Shack are all examples of successful companies that suffered because they did not embrace change. Learners addressed the competitive importance of being spontaneous. Change and uncertainty are inevitable. Failure will occur. Rather than resisting failure build a culture that embraces change, explores chaotic situations, and recovers from the inevitable unexpected events, which leads to developing the ability to adapt (Nelson & Squires, 2017) and cultivate skills in thriving in unforeseen and unknown circumstances (Paxton & Van Stralen, 2015; Crossan & Sorrenti, 1997). In finishing the course, learners shared that they were inspired to embrace improv techniques to become agents of change in the workplace.

Discussion

Improvisational tenets and structured activities have a place in leadership education. In this study, we examined students’ experiences in an improv graduate business course. Additionally, we explored students’ perceptions around integrating improv tenets and strategies to their professional life. Even though the literature review did not reveal a sole checklist of desired leadership approaches (Allen, 2018; Nelson & Squires, 2017), non-linear employee-focused leaders appeared to be equipped to connect with and influence their employees. The ability to influence can drive achieving organizational objectives (Gandolfi & Stone, 2018; Goleman, 2000; Lind & Sitkin, 2007).

The literature review revealed that desired leadership traits included leaders that are adaptive, employee-centered, and influential (Allen, 2018; Nelson & Squires, 2017; Paxton & Van Stralen, 2015; Yukl, 2013). Participants in the Workshop in Managerial Improvisation richly addressed these traits and highlighted how organizational success involved collaboration, trust, and the ability to innovate. They shared that embodying the improv tenet yes, and in their professional life challenged them to move beyond personal agendas and competition to embrace partnerships. They engaged in activities that challenged them to be mindful and truly give other members in the course their full attention. They then committed to understanding what others contributed. In group and personal debriefs, participants identified their personal agendas and addressed strategies to divert and collaborate.

As mirrored in the literature, the participants highlighted that shifting from individualism to inclusive partnerships presented challenges because Western business tends toward the former (Crossan, 1998; Paxton & Van Stralen, 2015). Even though the shift toward authentic collaboration was difficult for many in the course, they discussed numerous benefits to promote relationships between team members and clients. They also addressed how the skills developed in the course will help them in navigating dynamic interpersonal relationships and the leader and subordinate hierarchy.

Participants explored how presence and mindfulness were foundational to establishing trust between members. They further discussed how recognizing one’s energy and another’s energy can provide valuable insight into navigating development sessions. Participants unpacked how recognizing energy and strategically adjusting energy can inspire creativity and drive organizational objectives. Rather than having one or two highly successful team members, in improvisational theater, often individual performers and teams are recognized. A leader’s ability to meet employees where they are and help them navigate to meet their personal goals and organizational objectives represent effective leadership (Goleman et al., 2013; Yukl, 2013). In this context, the employee, leader, and organization achieve success.

Participants determined that the skills learned in the course provided a competitive advantage. The improv tenets and techniques discussed by participants build on each other and are interwoven to support one another. For example, yes, and supports collaboration, trust, and creating a safe environment for innovation and spontaneity, and these are trends in effective leadership (Gandolfi & Stone, 2018; Paxton & Van Stralen, 2015). Participants considered how collaborating, adjusting energy, engaging creatively, and embracing spontaneity can be advantageous in job interviews, in obtaining and maintaining clients, and in providing the skills to adapt to the ever-changing world of business.

Suggestions for Future Research

Structured improv techniques can provide a modality to address core competencies in leadership education curricula, but this study narrowly explored student learning in one graduate business course. Further research is needed to continue the dialog around the application of improv in business, and more narrowly, in leadership development and improv's applications to teachable approaches. This study centered on one session of the Workshop in Managerial Improvisation. There is an opportunity to examine more sessions to determined if other learners have similar or different experiences and perceptions.

We also recommend further investigation beyond Duke University. Several other institutions, such as UCLA Anderson School of Management, Columbia University Business School, and Yale School of Management incorporated improvisation into existing business and leadership curricula. Their inclusion of improvisation provides the opportunity for further examination into learner experiences' in these courses and their perceptions around the application of improv into their practice.

This study's data collection included participant observations and document analysis; as a result, there is an opportunity for additional research approaches. We recommend interviewing professionals before and after being exposed to improv tenets and exercises. A longitudinal study interviewing the learners after completing a business course incorporating improv at various stages of their career may provide additional insight into potential applications of improv in leadership development and organizational development.

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Appendix A

Daily Reflective Journals

Participant Name/Code: _____ Date: _____

Participants are requested to compose a response of the length of his or her choosing to the below prompts following each day of the course titled, 573. Workshop in Managerial Improvisation.

Prompts: What stood out to you about the class? List specific exercises or experiences you engaged in during the session which resonated with you. Discuss why said encounters resonated. Describe your strengths during the session. Discuss your weaknesses during the class. Describe your growth in the class. How can you be more effective in your strengths and weaknesses (i.e. describe your areas for improvement.)? Describe the applications of the course content and experiences to life outside the course.

Indicate in writing in parenthesis any information you want withdrawn for the study.

Appendix B

Experiential Learning Journal

Participant Name/Code: _____ Date: _____

Participants are requested to compose a response of three (3) to five (5) pages double spaced to the below prompts following the completion of the course titled, 573. Workshop in Managerial Improvisation.

Prompts: List three (3) specific actions you will take to put the lessons of this course into practice at Fuqua. State specifically how you will achieve each action item. Do you think improvisational skills are important? Explain your rationale. Discuss instances when these skills were used or neglected in your professional life. Discuss your strengths and weaknesses as within improvisational decision making. Describe how you will improve your skills moving forward now that the class has concluded. What struck you as particularly interesting or noteworthy from readings, discussions, or exercises? Explain your rationale.

Indicate in writing in parenthesis any information you want withdrawn for the study.

Appendix C

Strategic Memo

Participant Name/Code: _____ Date: _____

Participants are requested to compose a double-spaced response, with a length of his or her choosing, to the below prompts following the completion of the course titled, 573. Workshop in Managerial Improvisation.

Prompts: The Strategic Memo should focus on how you will apply improvisational techniques to the field in which you intend to enter upon graduation. How successfully did you apply the three (3) specific actions referenced in your experiential learning journal? Describe how you took the lessons of this course into practice at Fuqua. Discuss your learning from challenges and successes experienced. Will this learning help you outside Fuqua? Explain your rationale. Consider the entire course, from January 11-15, 2016: What worked? What did not work? What did you learn that will help you to apply it again in the future? Describe current practices in your intended field of work. Address barriers to the improvisation in this area and how can you overcome them. What are the limitations of improvisation in this setting? What are the areas of opportunity using improvisation in this setting?

Indicate in writing in parenthesis any information you want withdrawn for the study.

INTEGRATING LIVE CODING AND INTERACTIVE SYLLABUS TO ENGAGE STUDENTS IN AN INTERACTIVE MEDIA ARTS COURSE

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ABSTRACT
Teaching coding to a diverse group of students has several major challenges. This paper will suggest two major teaching methodologies that had been shown to be effective in addressing many of the challenges at three small international liberal arts colleges. The teaching techniques used included a Live Coding and Interactive Syllabus. Findings included positive student dispositions during and after the use of the two methodologies; and more meaningful use of coding and discipline specific vocabulary by students. The authors will continue to implement the methods, collect data and further analyze the results in an on-going continuous improvement approach to effective teaching.
Key words: Information Processing, Student Engagement, Syllabus Design, Live Coding

INTRODUCTION

The concept of media art has been discussed in many forms throughout time. Derivatives of this discipline include new media art, digital media art, computational art, interactive art, digital art, Algorithm art, Generative art, and many more. For this paper, the term Interactive Media Art (IMA) is used to describe the work.

WHAT IS DIGITAL MEDIA ART EDUCATION

Historically Digital Media Art is thought of as the combination of arts and technology, resulting in the key skill of integrating the two disciplines. In digital media art education, students are taught the skill sets of developing art concept, and technical skill sets of implementing the idea, build projects. And more ideally, become fluent in combining both, taking advantage of how each can complement each other, resulting in a more powerful approach. However many courses may overly focus on the concept and minimize the practical part; or narrow the scope by teaching focused on the technology aspect of education, when students may not realize the function of the technology. In some cases, students might learn both the art and the technology independently, but still may not be able to integrate the two into a cohesive whole to build a complete project.

In our teaching approach, a major focus was to teach students how to build an authentic, project aligned with the Course Learning Outcomes based on art and technology proficiency. To teach art concepts, it was found that using a project-based approach combined with case studies has been effective (Iwamoto, Hargis, & Vuong, 2016). However, programming as an essential approach to digital media arts project development, is difficult to learn in a similar fashion. To accomplish this task, students usually require a steep learning curve, especially for beginners in digital media art major because art students usually find logic - the core and essence of programming - too strict, abstract (not visually obvious) and perhaps even boring to learn. There are many cases where students early in their career meet but cannot locate the problem, and give up on the problem feeling frustrated. They can view many of videos and feel they are able to complete the project, but they encounter problems quickly and are unable to make progress. Or they learned how to write program code, and then lose interest because they do not know how to apply to art practice.

#1 Live Coding

To overcome the challenges that exist between coding and art, the instructor provides live coding in-class, with real-time demonstrations and visual examples. This approach provides visual reference to the abstract codes and logic, and explain technical concepts more precisely. Students will follow the live coding at the same time they engage in hands-on practices and can access immediate assistance.

#2 Interactive Syllabus

A secondary challenge involved the diverse student group, who usually learn at different paces. The prepared students may become bored; and the confused students are often apprehensive to stop the class and ask questions. Thus, I created and shared an Interactive Syllabus, which allows students immediate feedback and helps the instructor to follow students' progress and adapt class content and peace responsively. With live coding and interactive syllabus, I help students especially beginners to surpass the difficulties in beginning programming study and to accelerate the learning process and hone a solid foundation for future explorations.

Our Main Contribution pursues two methods:

1. When the instructor integrates **Live Coding**, it acts as authentic activity allowing students to practice real-time and subsequently the instructor to identify timely feedback and individualized support (and incidental support, ie. those students near the student with questions could learn from the instructor feedback on the concept); [student says, "I am an artist mind"]
2. Offer an **Interactive Syllabus** as a communication tool to engage students by providing a real-time platform to elicit student concrete ideas on their progress, as the instructor can assist one student's question, which allows every student to observe, review and contribute (more than solutions to problems, but more like a spirit process for "HOW" to approach the problem).

LITERATURE REVIEW

Information Processing

The Information processing model initiates how learners code and decode meaningful information, attend to external stimuli, encapsulate relevant knowledge, skills and dispositions in long term memory, and recall the material upon appropriate cues or prompts (Atkinson & Shiffrin,1971). Further, this theory examines how new information translates to application by connecting and relating to knowledge already stored in the short-term memory store. (Schunk, 1996). This knowledge acquisition involves the application of cognitive, linguistic, motor and social skills (Hargis, 1999). In respect to knowledge acquisition, instructional design of a curriculum that incorporates active learning has been shown to improve the learning and understanding of students. In a metaanalysis of 225 studies, it was found that students in classes with lecturing were 1.5 times more likely to fail than classes with active learning (Freeman, 2014). Active learning strategies such as Live Coding and Interactive Syllabus provides similar environment for connecting students to conceptual frameworks.

Student Engagement

Student engagement as an instructional outcome has been shown to affect a wide variety of dispositions, knowledge and skills important to student success (Hargis, Cavanaugh, Kamali & Soto, 2014). Students are typically eager to engage in authentic, meaningful learning; although, the learning environment are frequently very different from their intrinsic motivation, and career goals. Also, the ways students seek to engage are as different as their ways of processing information (Carini, Kuh & Klein, 2006). A major challenge to teaching well is how are multiple learning opportunities created when students are asked to do more in less time (Kuh, 2001). One method to address these challenges is to provide efficient, active models of instruction, where students can connect their background and ways of learning to their personal career path (Appleton, Christenson & Furlong, 2008). Students have been shown to increase engagement in immersive authentic settings, and project-based learning (PBL) (Salisbury, Umbach & Paulsen, 2009). The goal of these settings is to provide timely authentic experiences that align with learning outcomes, assessments and active experiences. Structuring these approaches in a relevant ways to gather student attention, and ultimate transfer of working memory to long term memory creates a successful experience for deep learning (Umbach & Wawrzynski, 2005).

Syllabus Design

The origin of the word syllabus is from the Latin word "list". In higher education, it is generally thought of as an outline of topics which will be taught. The traditional purpose of a syllabus has been generally viewed as a document to provide information, which students would need to complete a course (Grunert, 1997). Matejke and Lance (1994) suggest three ways a syllabus can be used - as a contract; a communication device; and a cognitive map. If the syllabus contains sufficient detail, it can be an accessible reference for students, when they need pertinent information (Hargis, 2014). In more innovative cases, the syllabus can act as a two-way communication device. During the learning experience, the instructor can add to the syllabus, helpful updates, pertinent resources and class activities. In this way the syllabus behave as learning supplemental resource (Hargis, 2014). Creating an interactive syllabus allows for more functionality, flexibility and is more accessible to a broad range of learners. A visual syllabus can also act as a tool for learner engagement (National Survey of Student Engagement (NSEE), 2013).

Live Coding

Live-coding is an approach to teaching programming by writing code during class as part of the lecture. In these sessions, an instructor thinks aloud while writing code as the students follow along by observing and writing code as well (Adalbert, Soosai, Jignesh, Richard & Rosenfeld, 2018). Adalbert et. al (2018) found that livecoding

(1) makes the process of programming easy to understand for novice programmers;
(2) helps students learn the process of debugging; and
(3) exposes students to good programming practices."

Similar approach to using live coding have shown positive results on student perception, disposition and achievement (Paxton, 2002; Rubin, 2013).

TEACHING ACTIVITIES

While integrating Live Coding and Interactive Syllabus as teaching method, several interactive media arts classes were conducted in the past three years. The Live Coding methods was first used is Fall 2016 through the Summer of 2019 at three different private universities in Asia. The Interactive Syllabus was developed as the need arose from teaching these courses and used in classes taught in the summer of 2019 in a Sino-America Joint university in Asia. Approximately 57 students participants (21 male and 35 female students) were taught using the Live Coding method; and 15 students (11 male and four female students) among them are taught for the Interactive Syllabus (Table 1).

Table 1. Course information, frequency and demographics.

Course Title	TEACHING METHOD **Live Coding**	TEACHING METHOD **Interactive Syllabus**	Students Participants		Teaching Time
			Male Student	Female Student	
Video Game Design	yes	yes	7	4	Summer 2019
Intro to Creative Programming	yes	yes	4	0	Summer 2019
Digital Art	yes	no	1	12	Spring 2019
Make Design Interact	yes	no	2	12	Fall 2017
Creative Coding & Making	yes	no	7	7	Fall 2016

All classes are taught to students from art and design background and with minimal understanding of technology, and are regarded as an introduction to interactive media arts courses with a focus on productive outcome. All classes are project-based, more specifically, self-directed projects. Students will develop their concept and ideas, learn necessary technical skills and build their own projects from scratch to completed.

In all five classes, students are encouraged and required to develop the project from their own original ideas and creative questions. Instructor works with students from the beginning of the class to look into students' background and interests, seeking for possible ideas that could connect to both students' personality and the course contents. Students will dive deep into their own previous experiences, values and opinions, and take advantage of background research and references as inspiration and discover their own creative and innovative ideas and directions of projects development. With projects ideas and direction of developments in mind, students will define the challenge and take the initiative to seek for solutions. Instructor will build a collaborative productive environment both in and out of the classroom with students. Student can then solicit and provide feedback to peers, adjust and improves their own projects. Students will learn and develop their conceptual and technical development skills along with the projects development.

The projects will be evaluated in different aspects, including the progressive efforts and collaborative participation in previously described process; and the conceptual and technical developments; and the project quality and perfection; the documentation and presentations; and punctuality of the projects submission.

1) The progressive efforts will be evaluated from students' motivation and investment during the process such as the challenges they choose and take, and their initiatives in solution seeking; and whether they

embrace and take positive influence from possible temporary failures; and how do they improve their project from peers' feedback. The projects development will benefit much from a collaborative environment, mostly from fellow students and instructor's feedback. The collaborative participation is also included in the project assessment, and require students to provide peer feedback to colleagues and solicit feedback from both peers and instructor.

2) The conceptual and technical developments also plays an important role in the project evaluation. Creativity and originality of the project count most of the concept development evaluation. Projects should reflect original thoughts and include students' personality such as their personal opinion and the connection between project concepts and their background and experiences. Students are also required to use references as background research and inspiration. For technical developments, projects demonstrate good understanding, complex and fluent application of technological concepts will gain more positive comments. The technical developments of project will be assessed with its complexity of programming technology adopted in development and whether they meet expectations of the project concepts.
3) The final delivery of the project should be completed working prototype that can be run live with minimal errors. And all the components should have been well polished as to perspectives of art, design and technology. The project runs in live smoothly and demonstrates good user interaction design, programming techniques and takes good usage of graphics, sound effects and etc. will be evaluated as high quality work.
4) The overall quality of the self-directed project will be assessed with all the progressive presentations such as project concept presentation, in-class development workshop and final project presentations as well as all the documentations for these processes. In the presentations and documentations, students should include the coherence of project from concept to result, with the initial ideas, the background research and inspiration, the progressive efforts, interpretation of results and proper citation of references.
5) All of the submissions should be turned-in on time, the full mark of punctuality is 10. A one-day delay of delivery will cause a one point reduction in the total grade.

The analytical rubric (see Appendix) used for the Self-Directed Projects is as follows:

- **Progressive Efforts, Motivation, Investment (15%)**
  - Takes challenges and shows initiative in seeking solutions
  - Embraces temporary “failed events”
  - Adjusts/improves the project based on the feedback
  - Significant time and effort
- **Collaborative Participation, Engagement, Contribution (15%)**
  - Solicits feedback
  - Provides peer feedback to colleagues
  - Does not hesitate to ask questions for troubleshooting
- **Conceptual Development, Creativity, Originality (20%)**
  - Original thoughts
  - Level of including personality, personal voice and connection in projects
  - Respects and use of sources as background research, inspiration and reference
- **Technical Development, Understanding, Complexity and Fluency (20%)**
  - Complexity of the subject, concepts or technology
    - (Excellent, Good, Weak) Complexity of programming concept attempted and meets expectations in (Excellent, Good, Weak) level
  - Evidence of understanding, application and/or analysis of technology.
    - (Excellent) taken more than (number) of the programming concepts and techniques taught in class and applied in Creative and Original format
    - (Good) used sample codes as a starting point and successfully developed the project from the reference in creative and Original format
    - (Weak) used some sample codes with minimal manipulation and adoption
- **Project Quality, Perfection (10%)**
  - Live Demonstration of a completed projects
    - (Excellent) Project runs stable with no errors
    - (Good) Project runs smoothly with minor error, however it clearly explains how it works.
    - (Weak) Project runs with major error and cannot run live
  - Polishing every component from the perspective of art, design and technology professionally.
    - Use of (Excellent, Good, Weak) user interaction design, programming techniques,

graphics, sound effects, etc. to enhance user experience and/or visual aesthetic

- **Presentation & Documentation (10%)**
  - Coherence of project demonstration from concept to result
  - Initial Idea, Research and Inspiration
  - Effort and Perseverance
  - Interpretation of Results, References and Correct Citation
- **Punctuality (10%)**
  - Progressive and final presentation. Documentations need to be submitted on time.
    - (Excellent) All submitted on time (10 points)
    - (Reduction) 1 day delay equal to 1 point off and the minimal is 0

Creative Coding & Making, Fall 2016
This class is conducted in New Media and Communication program at a university in China. The program offers a three-years' college diploma which teaches students new media arts and communication design. This program is very practical driven with a strong focus on teaching students practical skills so they can get into the job market right after graduation. Students are recruited to this program with strong fine art background but usually with minimal science knowledge such as math or physics. The class included 14 sophomore students, seven male students and seven female students and they have learnt design concept and digital design software skills such adobe suit .etc in their first year of study. The class meets three hours per week and lasts for 16 weeks and consisted of 14 weeks' classes for teaching and last two weeks for projects developments. All 14 students finished their individual project at the end of this class.

Make Design Interact, Fall 2017
This class was taught at a university in Shanghai, China with 14 students, which included two male and 12 female students in the 16 weeks' course. All students are sophomores with similar background to Creative Coding and Making, they joint the program with strong skills and experiences of fine art and studied general practical design skills such as graphic design, video shooting and editing, and design software such as adobe suite in their freshman year. And then they started this class in their second year but with minimal understanding of programming. The class was designed based on students' design background and regarded as an introductory course for the major. Thirteen students finished the class and their final project in the class. One student left the program in the middle of the class.

Digital Art，Spring 2019
This class was taught in a two years' master program at a sino-american university in Shanghai, China. It's a first-year introductory class in Cultural & Creative Industry Management major. The school and major has a strong focus on combine culture, creation with business and technology. Students came from various different backgrounds such as Economics, History, Media & Communication, Graphic Design, etc. Most students just finished their undergraduates and continued to study the program and this course right after. There are 13 students, one male and 12 female students in this class. The course runs for seven weeks, for three hours per week. Students are divided into four groups by themselves and all finished their final projects and were curated into an open art exhibition along with other course project.

Introduction to Creative Programming, Summer 2019
This class was taught as a one-week summer intensive class to high school students in a sino-american university in Shanghai, China. The class is part of a secondary Academy program and was designed to provide high school students experiences of university studies. The class runs from nine am to five pm and lasted for five days with a closing ceremony at the end. There are four male students all at grade 10, two are from Chinese international high school , one is from American high school and one is from Chinese local high school. There is one student had learnt about software programming in advanced level courses and the other three students had no previous programming experiences. All students finished their individual projects.

Video Game Design, Summer 2019
This class was taught in a sino-american university in Shanghai, China as introductory experiences of university studies. It's also part of the secondary program as the Introduction to Creative Programming course. There are 11 students, seven male and four female students in this class, among which there are four students at grade nine, two students at grade ten, four students at grade 11 and one student at grade 12. All students do not have previous experiences in programming or design. The class is designed to teach students basic concept of video game design and practical skills, so they can build their own video games. Eleven students divided themselves into three groups and have finished three group projects.

METHODS

Project-Based Learning (PBL)

To teach course concepts, it was found that using a Project-Based Learning (PBL) approach combined with case studies have been effective. Significant PBL research (Iwamoto, Hargis, & Vuong, 2016; Johansen, Scaff, & Hargis, 2009; Brown & Hargis, 2008; Hargis, 2007) have shown that this pedagogical approach is effective in many disciplines. Projects were demonstrated using first hand material and insights and professional colleagues' projects.

A major focus for this student was to teach students how to build an authentic, project aligned with the Course Learning Outcomes, and based on art and technology proficiency. The project analysis, coupled with a case study was modelled and reinforced throughout the term with projects from the instructor. Ultimately, one of the outcomes was to promote, monitor and measure self-directed/self-regulated learning as students completed their projects.

Live Coding and Interactive Syllabus

To effectively teach this type of technology, a “Live Coding" environment was offered where students follow the instructor who is coding real time in class, showcasing their thoughts, mistakes, approach and how they manage their thought process. Secondly, in conjunction, a shared interactive syllabus was created, where students can access and collaborate. Finally, this approach modeled the use and implementation of the tools by asking students to share progressive presentations, which align with industry standards and are open to peer critical feedback and remediation through dialogue.

Hardware Setup: First, the hardware environment for the course included content such as computers, Internet access, code editing software (Integrated Development Environment, IDE), web browser and Google Suite access. The hardware can be arranged in a computer lab PCs or school laptops connected to the internet and with software prepared in advance. Or in our case, students were allowed to bring in their own laptops. It is worth pointing out, that all of the IDE and Google Suite that were used in classes are open source or commercial software with free (trail) access.

The classroom is offers ample power supplies and Wifi that connected to the Internet with access to Google service. After all of the computers are connected, students will log into their Google accounts. The instructor will share access to the interactive syllabus as a Google Document. The instructor will grant all students with the editing access to the shared syllabus and emphasize that they should be careful when editing.

Software Setup: Within the interactive syllabus, the instructor can include all the links to different resources such as the link to download all the softwares, links to Google slides used in class, etc. With the links and instruction of how to setup the IDE, students can manage to download and install the specific version of the IDE. The class will then be working from the same software, coding environment setup. In our case, Processing IDE and Atom was run on Mac OSX or Windows. Both Processing and Atom are open source free software and require minimal setup.

When explaining the concept of programming technology, the instructor will open the IDE on the instructional computer and project to the main screen. The instructor will start to code and demonstrate examples of previously mentioned concept. The instructor will code some examples from the beginning and explain line by line at the same time he is coding. This approach is usually very slow and most students should be able to follow the live example. With hands on practices, students apply the concepts while viewing the immediate execution and result of their own code. The instructor will post the example code in realtime to the interactive syllabus so the student behind schedule can reference to and improve their own code. Students are also required to post not only their own code but also their results such as graphics in a screenshot format. Students can then view each other's work, and take reference from each other in real time.

The key concept of live coding is to demonstrate problems which 1) can be solved with a systematic approach and fluently; and 2) could also be difficult, perhaps frustrating to solve but eventually accomplished with sustained effort. Sometimes the class will naturally run into challenging scenarios, and the instructor can take the opportunity to demonstrate solution strategies. When a challenge does not present itself, the instructor can insert hurdles. The instructor can prepare more difficult problems for students to solve and encourage students to raise questions so they can discuss frequent questions for solutions.

After students are ready for more challenging tasks, the instructor will share more examples, scaffolding prior concepts. In addition, the instructor can share certain problems which guide the class towards the learning

outcomes. The instructor can walk around the class to offer one-on-one assistance for just-in-time learning. When the problem is easy, students produce various solutions and the interactive syllabus provides an ideal destination to share their efforts with peers and seek comments. When the problem becomes more difficult, students frequently are confused on a particular concept and cannot complete the problem. Students can post their problem to the interactive syllabus and the instructor can summarize common problems and bring to the attention of the entire class, which can create an efficient method for timely formative assessment.

When a problem is easy to solve, the instructor will demonstrate the fluent process of how to solve the problem and explain the general thoughts focussing on how he approached the solution. Another powerful aspect of this approach is when the instructor cannot describe an immediate solution and talks through the process of problem solving, so students can view authentic problem solving. The students and instructor will analyse the problem together, take inspiration from the discussion and try different possible solutions. It is important to show students how those obstacles can be resolved by explaining the process so they can learn to solve problems on their own.

Another advantage of using live coding as an engaging method is to offer problems that are not prepared in advance. To show the natural process of coding and solving problems with integrated short-term failed events, the instructor can encourage students to raise questions or find reference that are interesting to them from their prior experiences. The instructor and the students then select the most interesting questions and create possible alternative solutions together. All attempts and solutions and efforts will be part of the interactive syllabus, shared with everyone in real time, which provides a clear process for referencing.

DISCUSSION

The results from this study further informed the instructor on the teaching methods; how to attend to student knowledge, skills and disposition; and connect with students during class. The author applied the idea of live-coding, interactive syllabus and Google Suite. It was found to be convenient to collect student's response in real time, and their conceptual understanding before and after the lecture. This approach worked effectively, it was easy to share code and demonstrate in class, both from the instructor and students viewpoint. Plus, by using an interactive, collaborative syllabus, the result was complete documentation of the learning experience.

LIMITATIONS

The major variables in this study included the small number of students in the classes; private, liberal arts setting; and at the initial stages of developing data collection instrumentation. Variables were minimized by teaching more sections before summarizing the methodology; asking more questions along the way; and discussing the methodology with the university Center for Teaching & Learning. Ultimately, variables were accounted for by realizing this is a preliminary study advancing the live coding methods originally published in 2002, attempting to determine if these methods were generalizable in our setting.

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APPENDIX
Analytical Rubric for Self-directed Projects

Progressive Efforts, Motivation, Investment 15%	Takes challenges and shows initiative in seeking solutions / Embraces temporary "failed events" / Adjusts and improves the project based on the feedback / Significant time and effort
Collaborative Participation, Engagement, Contribution 15%	Solicits feedback / Provides peer feedback to colleagues / Does not hesitate to ask questions for troubleshooting
Conceptual Development, Creativity, Originality 20%	(Excellent, Good, Weak) Original thoughts / (Excellent, Good, Weak) Level of including personality, personal voice and connection in projects / (Excellent, Good, Weak) Respects and use of sources as background research, inspiration and reference

Technical Development, Understanding, Complexity and Fluency 20%	Complexity of the subject, concepts or technology / Evidence of understanding, application and/or analysis of technology
Completive Project, Quality, Perfection 10%	Live Demonstration of a completed projects / Polishing every component from the perspective of art, design and technology professionally
Presentation & Documentation 10%	Coherence of project demonstration from concept to result / Initial Idea, Research & Inspiration / Effort and Perseverance / Interpretation of Results, References and Citation
Punctuality 10%	Progressive and final Presentation, documentations need to be submitted on time.

LEARNING IN FINANCIAL BEHAVIOR CASE STUDY IN INDONESIA

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ABSTRACT
Learning in higher education has an important role in shaping student financial behavior. Where in the learning done one acquires knowledge which can then be practiced on daily behavior. Financial literacy plays an important role in guiding disciplinary behavior can be a supporting attitude of each individual in meeting the budget or planning that has been made in managing finances. This can be interpreted that discipline is one of self-control in terms of financial management This research is a quantitative study using the ex-post facto method. Respondents in this study were 100 students. The data collection methods used are questionnaires and tests. While the data analysis technique used is multiple linear regression analysis. The results of this study indicate that learning financial accounting, financial literacy and self-control simultaneously have a significant effect on financial behavior, financial accounting learning has a significant effect on financial behavior, financial literacy, has a significant effect on financial behavior, self-control has a significant effect on financial behavior.
Keywords : accounting learning, financial literacy, financial behavior

Intruduction

The world is now entering the era of digital economic evolution where the conditions of people are marked with greater ease and have greater opportunities in accessing various information, moreover one of the benefits of information technology is able to compress the limitations of space and time. The public is increasingly spoiled by the rapid development of technology because it is easier and faster in accessing the latest technology, the dissemination of information is also faster. Currently smartphone applications offer more features that can appeal to every visitor, especially teenagers. Moreover, this is supported by the financial economy of the middle class and above (Rakow, 2019). Teenagers are often said to have unstable nature which is easy to accept everything that is new, because the teenage phase is a process of transformation to find their identity. This is why teenagers often follow fashion and have luxurious lifestyles and high curiosity that have an impact on financial behavior.

Students with diverse backgrounds will of course have different management behaviors for each individual. Some overseas students and living away from parents usually always wait for parental deliveries to fulfill their living needs (Chen, 1998). If students are not good at managing their finances, the funds prepared for one month will run out prematurely. But there are also students who are able and good at managing finances well, so that sufficient funds are prepared for one month, and can even be set aside for savings or investment in other forms (Keown, 2011).

Individuals with high self control will be able to regulate and guide their behavior. They are able to implement the stimulus they face. Self control can be a consideration of someone behaving in financial management. Because with the self-control a person will look more at and pay attention to the actions carried out and the consequences that are carried out. So before deeds are done someone will think first (Lusardi, 2010). According to Sharon (2007) self-control is the state of a person who always considers factors that can influence each event and the consequences of its occurrence. Financial management is needed to improve or maintain living standards, minimize the risk of financial disasters, can invest optimally and accumulate wealth within a certain period of time. Good financial management should pay attention to the habit of recording the expenditure budget every month, determining and setting the objectives and tasks of each financial, conducting financial activities in accordance with the amount of income, and separating the needs and desires according to (Morgan, 2019).

Research on financial behavior that has been done by Perry and Morris (2005) states that there are three factors that influence financial behavior or also called someone's financial behavior including: first one's self control over whatever happens in life or also called locus of control. Second, one's financial knowledge on matters relating to money or also called financial knowledge. Third, the level of one's income or income. While research conducted by Arofah (2018) that there are factors that influence Financial Behavior are financial literacy, materialism, financial education. Research by Morrill et al. (2019) states that there are three factors that influence financial behavior are financial literacy, numeracy, and quality of education. From some of the opinions above, factors thought to influence financial behavior in this study were the quality of learning (financial accounting learning), financial literacy, self-control.

The first factor is learning financial accounting. Learning financial accounting is in the field of economics, students must have provided financial education and management in lectures. Students with knowledge and knowledge about finance are expected to be able to manage finances well and make financial decisions wisely so that students avoid financial problems. Learning obtained from courses given by lecturers is a milestone in the road directions to overcome student financial problems (Cloete, 2018). Through a variety of methods, media, and learning resources that are appropriate to the learning, they are able to provide students with skills in finance, so that students become ready to face life today and life in the future (Rakow, 2019).

Theoretical Framework

Financial behavior

Financial behavior (financial behavior) emerged in the 1990s in line with the guidelines for the development of the business and academic world that began to address the aspects or elements of behavior in the process of making financial and investment decisions. Before studying financial behavior, one must have an understanding of psychology, sociology, and finance (Keown, 2011). Meanwhile, some experts assume that human financial behavior is influenced by psychological drive. There are several theories that are included in this group and can further be classified into four theories (Isomidinova, 2017), namely: this theory states that a person's behavior is the result of learning from the accumulation of experience and life. This theory was developed by Pavlov, Skinner and Hull who stated that a person's behavior is the result of learning from experience. According to Chen (1998) there are theories relating to individual behavior problems and the two are in contradiction, namely Freud and Maslow's Theory. Basically, Freud stated that a person cannot understand the motivations that drive his behavior with certainty. Instead, Maslow said that a person's motivation can be linked to his needs. This theory states that a person's behavior is influenced by the social environment, such as family and social groups in which a person is a member (friends in campus, prayer meetings, sports associations). Basically, someone will try to harmonize his behavior with what is considered appropriate by the social environment. Thus, someone will buy the product if the product is accepted by the group. This theory views that a person's behavior is influenced by his social environment, but in a broader context. Included in this larger group are culture, sub-culture, and social class (Mandell, 2009). From the explanation of the relation of behavior theory above that is used as a theoretical basis for financial behavior in this study is the theory of learning.

Learning theory is applied to financial behavior to make changes to one's behavior in the actions to be taken next. Learning from experience makes someone more careful and think twice about making financial decisions when faced with financial problems. Daily inspection, management, control, search and deposit of financial funds. Financial behavior is also related to a person's financial responsibilities regarding how to manage finances. According to Ahinful (2019), attitude is an evaluative statement, both pleasant and unpleasant towards objects, individuals, and events. Attitude has 3 main components consisting of (Perry and Morris, 2005) cognitive, affective (feeling) and behavior or actions to purchase goods that are not in accordance with the principle that is believed. They tend not to want to use the money for pleasure.

Financial accounting learning

Learning (instructional) is a madness that aims to change and control a person with the intention that he can behave or react to certain conditions. From this understanding learning is one part of the overall teaching and learning activities (Marriott, 2017), whereas according to Howcroft (2017), learning is a process that exists in a person's environment intentionally managed to enable him to participate in certain behaviors in certain conditions. special conditions or produce responses to certain situations, learning is a special subset of education. Learning is the process of delivering material that is done between the teacher and students. The success of a learning is determined by the learning achievements and the changes that occur in students in the knowledge, behavior, and skills possessed which are increasingly developing and expanding. Learning according to Marriott (2017) is defined as an activity of the teacher teaching or guiding students towards the process of self-maturity. This understanding emphasizes the maturity process, which means teaching in the form of delivery of material does not necessarily convey the material (transfer of knowledge), but rather on how to convey and take values (transfer of value) from the material taught with the guidance of useful educators to be useful to mature student. Learning activities are carried out consciously and intentionally planned by the teacher in guiding and spinning students optimally. Teaching is an activity and assignment done by the teacher to students. Without one of them teaching will not go well. Teaching is systematically designed by the teacher by using appropriate techniques to create an enabling environment so that the learning process occurs (Howcroft, 2017). Learning planning is the process of decision making as a result of thinking rationally about specific learning goals and objectives, changes in behavior and a series of activities that must be carried out as an effort to achieve these goals by utilizing the potential and learning resources. The results of the decision-making process are the preparation of documents that can be used as references and guidelines in implementing the learning process (Marriott, 2017). Things that

must be considered in preparing a learning plan are: (a) the characteristics and abilities of students, (b) formulating teaching objectives, (c) choosing materials and sorting materials, (d) choosing teaching methods, (e) choosing educational facilities or tools, and (f) choosing an evaluation strategy. Objectives are guidelines that provide direction in teaching and learning activities. Method is one of the means to an end. The intended purpose is for students to have certain skills. In these objectives must be in accordance with the method used. So, the teacher should use the right method to support teaching and learning activities, so that the aim of teaching becomes effective. Choosing learning methods must be in accordance with the conditions of students. The learning method chosen by the teacher must be based on its benefits. So, it can be said that the teacher who has a way of reconciliation and good criteria in presenting the material with the right method in the teaching and learning process then the teacher is said to be competent. Rakow (2019) The main cause of poverty or financial problems is fear and ignorance imposed on a person will make the person trapped in a problem. Financial accounting learning obtained is used as a milestone in overcoming financial problems. Learning provides stock on ways to manage money properly and correctly. According to Perry and Morris (2005) states that financial education has a very important role for students to have the ability to understand, assess and act in financial affairs. Financial education in schools can also overcome financial problems directly facing young people (PISA, 2012). Whereas the results of Chen and Velope's (1998) research stated that although the level of financial literacy is very low, for all highly educated populations individuals are expected to get better financial knowledge and educational skills than those who lack education.

Financial Literacy

Financial literacy is knowledge, skills and beliefs that influence attitudes and behaviors to improve the quality of decision making and financial management in order to prosper (Mandell, 2009). According to the Program for International Student Assessment (PISA) in 2012 financial literacy is knowledge and understanding of financial concepts that are used to make effective financial choices, improve the financial well-being of individuals and groups and to participate in economic life. Financial literacy or financial literacy has many definitions. Thus, personal financial literacy shows the ability to know and understand management (management) of personal finance (personal finance). (Sharon, 2017). Financial literacy is financial knowledge that is often applied in daily life whether realized or not. Financial literacy can be defined as a person's ability to obtain, understand, and evaluate information that is relevant for decision making by understanding the financial consequences that result from the development of global financial complexity. Chen and Velope (1998) state the definition of financial literacy in four dimensions including: General Personal Financial Knowledge is a challenging understanding of matters relating to basic financial knowledge, (Morgan, 2019) sets out this aspect in several indicators which include the benefits of personal financial knowledge, knowledge of net assets, knowledge of expenses and income. There are five basic stages in a person's personal financial planning including: evaluating personal finances, setting personal financial goals, developing personal financial plans and reviewing the progress of plans, and revising personal plans that have been made (Keown, 2011). Saving and Borrowing (savings and loans) is a form of savings in the bank in the form of savings that usually comes from a portion of a person's income for reserves in the short term. Savings and loans can be in the form of time deposits, certificates of deposit, and demand deposits. Knowledge relating to savings and loans consists of knowledge of compound interest calculations, deposit characteristics, knowledge of credit card interest, credit card (Mandell, 2009). Insurance (insurance) is one form of risk control by transferring or transferring risk from one party to another (the thing meant is the insurance company). Basic knowledge about insurance and insurance products consists of life insurance, vehicle insurance, fire insurance, health insurance, and transportation insurance. Investment (Investment) is a number of funds invested in the hope that these funds increase and grow fast**.**

Self control

Self-control is as the ability to control themselves to arrange, guide, regulate, direct the form of behavior that brings individuals towards positive consequences. Furthermore, the ability to control oneself is related to how a person controls emotions and impulses within himself (Strömbäck, 2017). Strömbäck (2017) states there are four aspects that explain the characteristics of people who have low self-control, namely: Impulsiveness: This concept refers to someone who does not consider the negative consequences of the actions that will be done. They have an orientation here and now and are easily transformed to something fun. Physical Activity: This concept explains the individual with the concept of self-control describing how far the individual views the relationship between the actions he does with the consequences and results. Gathergood (2011) characterizes people who lack self-control and are more concerned with satisfaction, this will be easier and more likely to engage in risky behavior to pursue pleasure. Individuals who do not have self-control will tend to be excessive, impulsive, forcing their desires without regard to their abilities and norms because they only want to fulfill their satisfaction. In the attitude of self-control of each individual in financial matters, emotional control becomes an inseparable part of attitude. Because one's emotions are very influential in financial matters. A person must be able to control his emotional intelligence to help when making decisions. Emotional weaknesses such as mood,

high desire, greed, etc. will cause a person to not be directed in making financial decisions.

Method

This type of research uses a quantitative approach because it makes a relationship between variables. In this study, the independent variables consisted of financial accounting learning, financial literacy and self-control. While the dependent variable is financial behavior. This quantitative research uses the ex-post facto method which aims to explain how the variables in the study influence each other. The research design in this study was conducted to determine the effect of learning financial accounting, financial literacy and self-control on financial behavior. In this study samples were taken using purposive sampling technique based on certain criteria. The criteria set out in this study are as follows: The sample is limited to students who are still active in lectures. The sample is limited to students who have taken financial accounting courses. So, the number of samples is 100 students. The data collection techniques using tests and questionnaires. Data analysis techniques in research are used to answer the problem formulation of a study or test hypotheses that have been formulated in a study. Data analysis techniques used in research: Hypothesis. Hypothesis testing in research has the aim to test whether there is an influence or not between the dependent variables. Hypothesis testing in this study was carried out using a test in a partially and simultaneously manner. Testing was carried out using the t test, while simultaneous testing was carried out using the F test.

Result

Multiple regression analysis is used to determine whether the variables of financial accounting learning, financial literacy, and self-control affect financial behavior. The statistical t test results are basically used to show the variable to what extent the influence of an independent variable individually in explaining the variation of the dependent variable. The basis for making t test decisions is based on probability figures. If the probability of the analysis result is <0.05 then Ho is rejected and Ha is accepted. Based on the results of the t test shown in the table as follows:

Table 1. T Test Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32,413	8,554		3,789	,000
	accounting	,298	,177	,162	1,680	,016
	literacy	,056	,047	,113	1,172	,024
	selfcontrol	,520	,187	,267	2,772	,007
a. Dependent Variable: financialbehavior						

The effect of financial accounting learning on student financial behavior. The results of the t test value of financial accounting learning variables in this study amounted to 1.680 with a significance value of 0.016. because the significance value is less than 0.05, therefore, Ho is rejected and Ha is accepted. This shows that financial accounting learning variables significantly influence student financial behavior. The effect of financial literacy on student financial behavior. The results of the t test value of financial literacy variables in this study were 1.172 with a significance value of 0.024, because the significance value was less than 0.05 and therefore, Ho was rejected and Ha was accepted. This shows that the financial literacy variable has a significant effect on the financial behavior of students at the Faculty of Economics, Surabaya State University. The effect of self-control on the financial behavior of students of the Faculty of Economics, Surabaya State University. The results of the t-test value of self-control variables in this study were 2.772 with a significance value of 0.007, because the significance value was less than 0.05 and therefore, Ho was rejected and Ha was accepted. This shows that the self-control variable has a significant effect on the financial behavior of students of the Faculty of Economics, Surabaya State University. From the results of the t test above, the conclusions on the three independent variables are persistently significantly influence the dependent variable. The F statistical test is performed to show whether all independent or independent variables included in the regression model have a joint influence on the dependent variable. The basis for making the F test decision in this study is based on probability figures. If the probability of the analysis result is <0.05 then Ha is rejected and Ho is accepted. F test results in this study can be seen in the table below:

Table 2. Result of F test

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	819,238	3	273,079	4,833	,004[b]
	Residual	5424,472	96	56,505		
	Total	6243,710	99			
a. Dependent Variable: financialbehavior						
b. Predictors: (Constant), selfcontrol, accounting, literacy						

Based on table 4.23 above the results of the study showed that the calculated F value was 4.833 with a significant value of 0.004b. because the calculated F value is less than <0.05 then Ho is rejected and Ha is accepted. The conclusion that can be drawn in this study is the learning of financial accounting, financial literacy, self-control simultaneously have a significant effect on financial behavior. The coefficient of determination (*R*2) in a study basically measures how far the ability of the regression model in explaining the dependent variables. The magnitude of the effect of the independent variables on the dependent variable partially can be seen in table 3 as follows:

Table 3. Determinant Coefficient

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson R Square Change	F Change
1	,362[a]	,131	,104	7,51698	,131	4,833

Based on table 3 above the research results obtained Adjusted R square value of 0.104. This shows that the coefficient of value determination in the variables of financial accounting learning, financial literacy, and self-control contributed 10.4% to financial behavior. While the remaining 80.6% is influenced by other variables not examined in this study. The effect of learning financial accounting, financial literacy, and self-control on financial behavior of students of the Faculty of Economics, State University of Surabaya The results of this study indicate that learning financial accounting, financial literacy, and self-control simultaneously have a significant effect on student financial behavior based on the results of data analysis using analysis Multiple linear regression in the Anova test or the F test obtained a probability value of 0,000. Therefore, the probability value is less than 0.05, so it can be concluded that the three independent variables simultaneously influence financial behavior. This is also supported by the results of the adjusted R square value of 0.104 or 10.4% of financial behavior. While the remaining 80.6% is influenced by other variables not examined in this study.

Facing an increasingly complex life makes it easier for someone to spend their money to meet every need, if it is not well managed it will make it wasteful in finance. So that every person must be aware of financial behavior. Good financial behavior makes someone orderly in financial matters. Strengthened by Mandell (2009) states that learning how to manage finances is one important thing that someone has. In managing good finance is not only important for the elderly, but those who are still young like students need to understand in managing good finance is not only important for adults. Learning in higher education has an important role in shaping student financial behavior. Where a student gains knowledge which can then be practiced on a daily basis. Based on theoretical studies, learning theory by Pavlov, Skinner and Hull that a person's behavior is the result of learning from learning experiences can be applied to make changes to the wrong behaviors in managing personal finances. Knowledge plays a major role in determining whether a person's financial behavior is good or not. Where someone who has financial knowledge or good financial literacy will lead to good behavior. The same thing happens to students, if they have good financial knowledge or financial literacy, they will be able to have smarter and smarter behavior in financial management so that expenditures are made for effective needs. In addition, self-control also influences how students manage their personal finances. self-control is a skill possessed by individuals in controlling and regulating financial behavior in accordance with the situation themselves and the surrounding environment. More broadly self-control as the ability to change and adapt to a matter in managing finances for the better. The results of the t test value of financial accounting learning variables in this study were 1,680 with a significance value of 0.016, because the significance value was less than 0.05 and therefore, Ho was rejected and Ha was accepted. This shows that financial accounting learning variables significantly influence student financial behavior. By obtaining financial accounting learning in a good college, it shows that the student has good behavior in managing and using it. This is reinforced by the statement of Perry and Morris (2005) in financial education has a very important role for students to have the ability to understand, assess, and act in financial interests. PISA (2012) in addition to preparing young people for their adult lives, financial education in schools can also overcome financial problems directly facing young people. Based on data analysis can be known indicators of learning materials, learning methods, media / learning

resources, learning evaluation. From these indicators show that financial accounting learning materials taught by lecturers provide benefits in everyday life in managing finances. This can be seen from the number of students who answered agree with each statement item. The results of this study are supported by the research of Chen Velope (1998) and which shows the effect of learning in higher education on financial behavior, and Cloete (2018) learning financial accounting influences financial behavior.

Conclusion

Based on the results of the study it can be concluded as follows, learning financial accounting, financial literacy and self-control simultaneously have a significant effect on student financial behavior. Financial accounting learning has a significant effect on student financial behavior. Financial literacy has a significant effect on student financial behavior. Self-control has a significant effect on student financial behavior. Financial accounting learning in this study is a learning activity that has been taken by students in which insights and competencies in financial accounting aim to change and determine appropriate behavior in managing personal finances and be able to implement in everyday life. Financial literacy referred to in this study is the knowledge and ability to use that knowledge to manage finances and make better judgments about the financial problems to be achieved. an activity in improving students' knowledge and skills in matters relating to finance consists of general knowledge about finance, investment savings, and insurance. Financial behavior in this study is the actions or actions shown by students regarding the use and management of sources of money to be used as a decision on the use of funds and as a determinant of the source of funds.

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THE EFFECTIVENESS OF DESIGN THINKING AND COLLABORATION ON EDUCATORS' INTERNSHIP

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ABSTRACT
In the present study investigated whether the adopting strategy "design thinking" has benefited the effectiveness of prospective teachers by developing cross-curricular work plans and educational action plans during their internships. The sample is comprised of 20 pre-service teachers of the 4th year students in the Faculty of Early Childhood Education Science, in Greece during the academic year 2017-2018. The methodology that was followed was the qualitative analysis of the discourse in the submitted minutes of the students' activities and assessments that coded the concept of "design thinking" and "creative collaboration". The conclusions indicate that the pre-service teachers believe that they have developed the design thinking, the creative collaboration during the implementation of the work plans through discussion, teamwork, collective planning, implementation and collective reflection feedback on work plans.
Keywords : design thinking, pre-service teacher education, internship, collaboration.

DESIGN THINKING

Design Thinking is a strategy that can use the educators in order to find a solution in teamwork. Koh, Chai, Wong & Hong (2015) define that " *Design Thinking characterizes the mental processes that practitioners use as they frame, explore and reframe ill-structured problems to derive design solutions".* As they have mentioned in their research Gul, Cassuma, Ahmada, Khana & Saeeda (2010) "*Design Thinking can serve as the missing link between theoretical findings in pedagogy science and the actual practical realization in schools. It meets the crucial criteria for effective 21st century learning by facilitating interdisciplinary projects, approaching complex phenomena in a holistic constructivist manner. It thereby leads to a transition from the transfer of knowledge to the development of individual potentials. It enhances the implementation of learning by giving teachers more confidence in creating and exercising collaborative project work.* It is estimated that this strategy enhances the teamwork and their connections. The relationship among students and mentors is positive and fruitful.

There are researches that prove the effectiveness of Design Thinking in education (Wooff, 2017). Furthermore, these researches indicate that the internship of educators prepare teachers who are equipped with critical thinking. Afterwards these educators who can plan and deliver the programs exhibit higher level thinking in their teaching practices (Gul et al., 2010).

In other research by Noweski (2012) indicates the fostering of students social and metacognitive competences through Design Thinking. It offers teachers the needed support towards in a new way of teaching. Through a formalized process it may serve as a bridge between demand and reality.

For Meinel & Leife (2012) the procedure of Design Thinking is a cycle where synthesis and divergent thinking, analysis and the nature of the problem all come together and finally achieve a resolution. In Design Thinking processes there is no solitary action or procedure that actually defines the process. There are as many different design processes as there are design thinkers (Meinel & Leifer, 2012· Wrigley & Straker, 2017)

CREATIVE COLLABORATION

More recent perceptions of creativity hold that it is not only characteristic of individuals but also of groups (Kampylis & Berki , 2014· Kim et al., 2019). Cropley (1999) defines creativity as a social phenomenon. The concept of collective / collaborative and group creativity describes the joint effort of two or more individuals to achieve an innovative result that cannot be achieved by one person alone (Kampylis & Berki , 2014).

According to Pirola-Mero & Mann (2004), collaborative creativity arises in two ways, either through the total efforts of creative individuals, who work independently first and then collect their individual elements, or through the interactions of team members, where creative performance depends on the contribution of the whole team from beginning to end.

INTERNSHIP MODELS IN EARLY CHILDHOOD EDUCATION STUDIES

In recent years, the Department of Early Childhood Education Science, Democritus University of Thrace in Greece, in an effort to meet the new educational challenges of enhancing the creative collaboration of

prospective teachers, has been applying learning processes and methodologies that provide future educational tools to become more creative. Two of these processes is the professional development model Lesson Study (LS) (Fernandez, 2002· Lewis, 2002) and "design thinking" (Chapman et al., 2016), which encourage developing thought-provoking teachers (Karadimitriou et al., 2014) who can design, implement and evaluate the educational process creatively by actively participating in learning communities. Furthermore, through these models is developed the collective as well as individual creativity, critical thinking and collaboration skills share-design, participatory learning and educational reflection. Both methodologies are integrated into active learning and creative problem solving processes by placing the prospective teacher at the center of the process. In addition, it is possible to freely develop ideas without criticizing either the supervisor or the team members for the purpose of releasing their creativity. Finally, enhancing empathy, where prospective teachers strive to understand students' needs and interests.

The "Design Thinking" model consists of five stages: (a) empathy, in which designers of an educational process understand their subjects (e.g. students), their needs and interests within relevant contexts (e.g. class), b) the designation that designers clearly define one or more "needs" of the subjects, based on what they understood from the interaction with the subjects in the previous step; involved in a storm ideas to design actions or give solutions or new ideas by combining imagination and creativity; d) producing an original project or idea created by the designers to test and give the necessary feedback; e) the application, where the subjects test the original project or idea and give feedback to the designers to improve it (Chapman, et al., 2016).

Specifically, the Lesson Study model consists of a series of circular phases, which are as follows: Collaborative design of the course, Implementation and observation-recording, Reflection - evaluation - detailed feedback, and redesign (Fernandez, 2002; Bruce & Ladky, 2011).

During the Internship of the 4th-year prospective teachers, groups of five, who collaboratively design, implement, and explore in early childhood education class the cross-curricular work plan or educational action plan or even a combination of two learning goals. The structure of the Internship combines the phases of both the LS 'lesson study' and the Design Thinking model and consists of a series of circular phases which are as follows:

1) Prospective teachers as project planners firstly they visit the classroom, discuss with the kindergarten teacher, and observe students in order to gather first-hand information about the target group. They then work together with the responsible teacher supervisor to design and implement daily activities that will be implemented during the week of kindergarten engagement in order to understand and respond to students' needs and interests in emerging potential issues. The Work Plans: Daily, two of the prospective teachers are animated and actively involved in discussions with students during both free play and organized activities, and the other three observers observe the children's educational process and behaviors.
2) After the engagement week is completed, prospective teachers collectively evaluate it by handing in a detailed report (evaluation sheet) to their supervisor analyzing and clarifying the reasons for developing specific work plans that are of interest to children as well as their specialties.
3) Candidate teachers have two weeks to collaborate and produce ideas using the brainstorming technique and plan out their work plan, goals and observation axes. The tutor then sets up small feedback groups of five prospective teachers who present each other with the plans under study to identify weaknesses and incorporate improvement suggestions.
4) In the next phase, the teams implement the work plans with the students for two weeks. On a daily basis, two of them, with the primary role of inspiration and the other as auxiliary, carry out the planning and the others observe the educational process by taking notes on the course of instruction and the achievement of goals by students.
5) In the fifth phase, all team members participate in an evaluation and feedback session on the outcomes of the 'lesson / work study' daily, student learning and prospective teachers, and errors, weaknesses are identified, good and bad practices while developing and incorporating the improvement suggestions that came up during the feedback session. At this stage, prospective teachers develop flexibility by changing and customizing where the work plan is needed, taking advantage of students' needs, interests, and suggestions.

It is worth noting that feedback meetings are conducted in all the above phases with the responsible tutor supervising.

RESEARCH PURPOSE

On the basis of the foregoing research, in this study investigated whether the adopting strategy "design thinking" and creative collaboration has benefited the effectiveness of prospective teachers by developing cross-curricular work plans and educational action plans during their internships.

Research sample

The research sample consists of texts from 20 prospective 4th year teachers in the Faculty of Early Childhood Education Science during the academic year 2017-2018.

Research questions

Based on the above, the research questions that arise are the following:

Q1 : In what ways do pre-service teachers think they have developed Design Thinking when implementing work plans?

Q2: Does the "Design Thinking" process benefit from enhancing the collaboration among prospective teachers?

Q3. Is there a difference between groups and between team members in "design thinking" processes and creative collaboration?

RESEARCH PROCESS METHODOLOGY

The methodology followed was the qualitative analysis in the submitted minutes of the students' activities and assessments. The objective in qualitative content analysis is to systematically transform a large amount of text into a highly organized and concise summary of key results (Erlingsson & Brysiewicz, 2017). In analyzing and comparing texts and presenting them, we focused on the concept of "design thinking" and "creative collaboration" and the elements that enhance them.

RESEARCH RESULTS-ANALYSIS

The analysis of the texts revealed that prospective educators believed that through the collective design, implementation and feedback of work plans they tried to develop the Design Thinking and creative collaboration and, thus, to exploit a range of appropriate conditions on their own, methods and techniques. There is interaction and collaboration among future educators, who are being members of a learning community. They followed the design thinking process that has created the appropriate supportive framework to develop our creative collaboration.

"Specifically, we felt comfortable to create, implement and reflect on new ideas by following social processes, such as the exchange of information within a collaborative coordination with defined motivations and goals." (X1)

"I self-assessed, recognized the strengths and weaknesses of my teaching, worked with my team to achieve a common goal, and cultivated critical thinking. As far as working with my team, I think we worked as a whole. There was mutual help and support. Each one had its strengths and weaknesses, which within the team utilized all the skills of each member for the best possible outcome. I find it useful that I was judged and evaluated, not only by the supervisor but also by my team members. In this way, there is greater feedback and active involvement of the process than all members, identifying possible mistakes and effective practices aimed at improving each member individually, as well as improving the team collectively. Therefore, there is a more holistic view of improving teaching, as more people are involved, an error that we have not identified in the course of our activity may be discovered by another member or vice versa" (X3)

"I learned through them how to work better, to listen to others first and to accept the good and the negative criticism, because through it I can evolve." (X4)

"Through collaboration and discussion we made changes to activities in case of disagreement. There is a reflection that has also helped us a lot because through discussion, feedback and criticism you can understand the pros and cons of your teaching, your character, what helps you and what doesn't, how you feel about something and how realize the rest. There were many benefits to seeing each other's bad points and then avoiding them you, you see what works and what doesn't, you understand what needs to change and what doesn't at any time teaching." (X5).

It helped to develop their ability to collaborate both at the level of collective planning of daily programs and daily collective feedback sessions with their team and supervisor. While working with their classmates on

project design of teaching, they exchanged ideas and opinions that they would not have thought alone. Each with its own knowledge and experiences added something to complete the planning of activities.

"Suggestions set were mentioned by each of them, discussed and either rejected on the grounds of the others or were strengthened. We came together as a result of a combination of ideas and thoughts and at the same time we worked on teamwork and collaboration. The feedback process with my classmates and supervisor was very important. Following my teaching, they identified errors that I had not identified. It's different to see the lesson as a third person and anyway be an active player in the learning process" (X6)
"*It gave me the opportunity to reflect on the practices I applied and to critically engage my work during the learning process in the classroom".*

Efficient techniques have also been identified, which implies not only the negative criticism of their educational action, but also the positive, in order to maintain those strategies and to facilitate the process learning. During the observation of the training process they were able to identify both good and bad practices of their colleagues. This has allowed to critique their work and either avoid the bad practices in their own educational action, either to adopt or incorporate the good ones.

"*We had feedback discussions every day, where we talked about the mistakes we made in order to improve the future activities. We also exchanged ideas to approach activities in a different and more creative way. Every day we were discussing our mistakes and the ways we could apply them in order to carry out the activities in the best possible way. This has led us to think of more creative and effective ways to conduct an activity the next time.* " (X8)

As a team they were planning activities. After completing the daily program, they were studying their activities with the aim of empowering the positive and improving the weak. At the level of collective planning of daily programs, they believe that collaboration with members of design team has been a positive contribution to their activities, as there was communication and positive interactions with oral level. The planning of their activities was done in a collective way level. On the other hand, at the level of daily collective feedback sessions, with both their team members and their supervisor they helped them more on developing their cooperation skills. After at the end of the daily program, they met with their team, posing to discuss evidence that they collected from the observations. Through daily discussions with the reviews and the feedback among the team members, they managed to go on one step below and change some practices that they found to be wrong. Also, daily collective feedback conversations helped them, as they have contributed to the development of criticism as well as creativity thinking and they managed to judge which items are right and which are not, either these were about the pedagogical materials that they had to bring to class, or course of an activity. Also, regarding the cooperation with in members in their group, they were exchanging ideas and thoughts, where everyone offered their knowledge in their own way and this has resulted in reaching out activities in a different and more creative way.

"It enabled me to reflect on the practices I applied and critically approach my work in the classroom learning process. On the other hand, identified and effective techniques, which involves not only the criticism on my educational activity, and positive, in order to maintain these strategies and facilitate the learning process." (X10)

"All we worked together, we exchanged views, we researched and we came up with specific activities. The process of planning activities and gave feedback was equal to all team members without there were injustices, disagreements and misunderstandings." (X11)

"It was the reason for me to change the way I think. Regarding his cooperative part, he helped me a lot in organizing it program because this is our first substantive experience and I needed the team spirit. There were many different ideas from all of them team members from the beginning to the end of the program that I held and I'll use them in my future action." (X12)

They develop the collaboration skills as there were frequent discussions about each stage. The conversations and communication between the team members contributed to developing the co-working abilities both during the collective designing daily schedules as well as daily sessions collective feedback.

"The collective design of daily programs as it helped us to focus more on the needs of the children and evaluate each of our activities based on the criteria discussed. The daily feedback sessions with the supervisor were just as helpful because they asked us questions and "forced" us to think on the part of the children to see if a

particular activity we were planning to achieve and why. So, we identified errors that we would not have thought otherwise." (X14)

"In terms of collaborating on the collective design of the daily programs, we all came up with ideas, exchanged views and made collective decisions. All members also took on roles in the division of tasks. Our team was well prepared during the planning meetings. "(X15).

It is essential to promote collaboration among team members and this help improve teachers to cultivate critical thinking and the process of self-evaluation, collaboration, feedback and evaluation. The collective planning of the daily programs helped a great deal because they were in the process with the team members to gather, discuss and plan the activities they would present each day. Teamwork was very important because the cooperative skills were developed, the creativity was nurtured and they had the opportunity to exchange views, thereby acquiring new ideas. The daily collective feedback with the supervisor was also very helpful because it helped to understand the points where they made a mistake and also gave valuable tips and ideas that may be useful in the future. Sharing opinions with other groups helped to understand that the team can function differently depending on how each group and each kindergarten teacher is taught.

"As far as the cooperation part is concerned, it was very good with all its members of my team and there were no problems. In the collective design of daily schedules, there were retreats where needed, the team listened and took seriously the opinion of each member and all the students we had roles that fit our personality and abilities, resulting in each of us being instrumental in creating and implementing of our program, as well as the shaping of the final work. Also, there were daily collective feedback sessions with all members. All of us were marked by reflection." (X18).

"The collective design of the daily programs helped tremendously because there was pluralism. Hypotheses have been put forward, contradictory until we reach something that is generally accepted. Subsequently, particular skills of cooperation and co-responsibility were developed in the daily collective feedback sessions with both my team members and my supervisor because there was an exchange of views, mutual evaluation and feedback, which ware used to our advantage. Also, through the process of observing the educational process there were really benefits to the 'next step', to my improvement and to the way children learn." (X19).

"We try to identify our right and wrong elements. The outcome of the feedback and cooperation has been positive. There were certainly benefits to promoting cooperation and active participation by all. It also contributed to the development of critical thinking, reflection, feedback and self-evaluation." (X20).

CONCLUSIONS

The results make it clear that, based on the research questions posed in the present study, pre-service teachers believe that they have developed the design thinking, the creative collaboration during the implementation of the work plans in a variety of ways and methods of teaching. In more detail, through discussion, teamwork, self-efficacy, collective planning, implementation and collective reflection feedback on work plans. There is a critical reflective process, which help the pre-service teachers to improve their self-efficacy.

The internship combined with design thinking processes benefits the enhancement of both the collective and individual creativity of prospective teachers (Tan et al., 2018).

Lastly, we did not find that there was a difference between the teams and the team members in the " design thinking " processes and creative collaboration.

All these results indicate that the critical frame is the only that can redefine their opinions of pre-service teachers. They can dispute and renegotiate the elements of the education process in their team that participated in. The more query whether, the more practice to critical education (Freire, 1970). If there is no critical thinking and critical reflection in a collaborative approach, then there is no effective outcome of the pedagogic method.

SUGGESTIONS

Based on the above conclusions, a holistic critical approach to fostering the Design Thinking and creative collaboration of pre-service teachers in their internship program is proposed. As Koh et al. (2015) says "*In the field of education, design thinking has not yet seen widespread permeation into the pedagogical vocabularies of students and teachers. There is a need to better understand the potential application of design thinking in educational settings".* Further refinement and adaptation of this program is essential, as it is the goal of the program itself, an endless collective reflective process that puts the prospective teacher at the core with active

learning and creative problem-solving processes. This is achieved through the critical thinking, with the aim of unleashing the educators their creative collaboration.

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VALUE ORIENTATION AND JOB EFFECTIVENESS OF NEW ACADEMIC STAFF OF PUBLIC UNVERSITIES IN NORTH-CENTRAL NIGERIA

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ABSTRACT
The study examined the extent of value orientation programmes on the performance of lecturers in public Universities in North-central, Nigeria. The study was precipitated by perpetually observed problems of weak University culture and the constant poor job effectiveness of most teaching staff in public Universities in North-Central Nigeria. Most of them are unhappy and uninspired with the unconducive working environment. The lack of good working condition has no doubt, translated into poor pedagogy, lack of commitment and dedication to duty, poor feedback to students, reduced levels of research outcomes and community service with resultant effect on students' performance and University's goals attainment. The conduct of induction training is often justified for its purpose to help new employees to fit smoothly into an organization. The research design adopted for this study was the descriptive survey method. The population of this study consists of all the seven thousand seven hundred and forty seven (7747) academic staff members and two hundred and fifty three thousand eight hundred and seventy two (253872) students working and studying in the thirteen public Universities and the Federal Capital Territory in North-central Nigeria
The sample of 501 lecturers and 2363 students from six public Universities was used. This was based on the Yamene (1967) formula for sampling. Data was collected using the 'Value Orientation Programmes and Job Effectiveness of New Academic Staff' Questionnaire (VOPJENASQ) for lecturers and Academic Staff Effectiveness Questionnaire (ASEQ) for students. Mean, Standard Deviation were used to answer the research questions while Pearson Correlation was used to test the hypothesis at 0.05 level of significance. The result showed that there is significant relationship between job effectiveness of lecturers and value orientation programmes in public Universities in North-central Nigeria. The findings also revealed that value orientation programmes for new academic staff members have a positive influence on job effectiveness of lecturers. Thus, in order for new academics to be effective in their job duties, administrators should encourage value orientation programmes for new academic staff to stabilize them in their new job challenges by designing induction programmes and guidelines for job effectiveness and University goal achievement. Senior academics should not only be concerned with administrative, teaching and supervisor/supervisee relationship, they should be made by policy and insist they share time, skills, knowledge and competences to new staff members as a necessary means of handing over professionalism.
Keywords: value orientation, job effectiveness and public universities

INTRODUCTION

There has been quest by government to improve access to University education as well as quality education. This expansion is not without its challenges, particularly with respect to quality of education service delivery. To cope with the increased enrolment due to increase access and to adequately provide staff for their various programmes, Universities have had to employ more academic staff. These new lecturers are expected to immediately carry out academic activities such as teaching, research and community service. However, there are complaints by students and parents that such new academic staff members are not adequately prepared to face the new job challenges and demands considering their different backgrounds and experiences. There is need to provide new lecturers with some value orientation and induction programmes to help them perform efficiently and effectively. Universities like any other organizations become one of the institutions that face a lot of changes and transformation to enhance their skill and performance towards international standard. The development of lecturers' efficacy and teaching performance are often in the centre of attention in Universities. The challenges experienced by Universities currently, such as large student enrollments, globalization of education with inherent competition has called for more current expertise in delivery of quality education and research output. The emerging issues of University staff turnover, brain drain have now placed pressure on lecturers to perform and improve the status of the University in the global academia. Thus, lecturers' are required to prove their credibility in the Universities based on the strength and magnitude of their research activities, teaching and community services among other ethics.

Value orientation is formal structured programmes intended to help new lecturers to integrate themselves properly into the University system. It is also to enable new lecturers to adequately acquire professional ability and competences to enable them face their job exercises. With the rapid global workforce changes, value orientation and induction programmes have been fully responded to as a means of enhancing job effectiveness of especially new employees. Starting a new job in a new work environment brings series of adjustment challenges

to an individual. It is crucial therefore, that to achieve institutional performance and enhance credibility, Universities should emphasize the effective acquisition, utilization of value orientation and induction programmes. Induction enables new lecturers to understand the University culture and how they can be most effective in it, become familiar with departmental practices, policies and guidelines, appreciate and understand fully the expectation of their roles (Anijaobi-Idem & Archibong, 2012). A value orientation and induction programme has become the vehicle for meaningful change which plays an integral part in developing the University's philosophy, goals and expectations. Beliefs are the convictions that we generally hold to be true, sometimes without proof. They are basically judgments that we make about ourselves and the world around us. Our values therefore stems from those beliefs. The strong conviction that a school has on the relative worth of certain abstractions such as; hard work, equality, honesty, education, effort, perseverance, loyalty, faithfulness constitutes its beliefs and core values Adetoun (2006). Schools will be mindful of all these important variables that will lead to the attainment of its goals. For example, only qualified teachers will be employed to teach and admissions will only be given on merit, the school environment will be made safe and conducive for learning and effective supervision will be given to monitor performance.

The improvement of access to University education is not without its challenges particularly with respect to adequately provide staff for the various programmes and the expected quality of education service delivery, Universities' administrators have had to employ new lecturers. These new academic staff members are expected to immediately begin to carry out academic activities such as teaching, research, examination administration and supervision of students' projects and theses. One wonders whether all new recruits are adequately prepared to face the new job demands. If staff members are to establish themselves quickly, efficiently and effectively, there is need to provide them with guidance, support and information in a planned and considered way (Anijaobi-Idem & Archibong, 2012). Starting a new job in a new work environment presents series of challenges to an individual irrespective of previous experiences. An induction process serves as a starting point from the training and development of new staff. Well-meaning organizations take positive steps to cushion the effect of these demands and ensure an easy transition period for the new employee in terms of roles and responsibilities, organizational norms and relationship with work colleagues. Induction enables new staff to understand the culture of the University and how they can be most effective in it. It also helps new employees become familiar with departmental practices, policies and guidelines and understand fully the expectation of their roles, duties and activities of the job and to begin to perform them effectively. A conducive work environment in terms of early socialization at work place for academic staff is needed for their job performance (Ajayi, Awosusi, Aroguntade & Ekundayo, 2011).

According to Ajao (2011), the benefits of a thorough induction are: staff feels welcome and valued; accelerated success and effectiveness, improved personal and professional well-being; heightened job satisfaction; greater self-confidence and enhanced commitment to students, school and profession. There is no doubt that when academics are provided with an appropriate and well-planned induction programme they are more highly motivated. Induction programmes can extend new lecturers range of skills and knowledge, enabling them to be more adaptable and are less likely to waste the University's resources and staff time. Such prgrammes are beneficial and could reduce the levels of stress and anxiety for new lecturers. Despite these importance and benefits of professional socialization, Universities do little to integrate their new members, leaving them as it were to find their own solutions in the complex academic world which needs investigation (Anijaobi-Idem & Archibong, 2012).This contradicts Hendrick and Louw-Potgieter (2012) that found out that value orientation does not have any significant influence on employee performance. This contradiction needs further examination to ascertain the claim. An induction process serves as a starting point for the training and development of new staff. Given the challenges confronting new staff, it is therefore vital that Universities ensure that new staff understand the mission, vision, goals, values, expectations and demands of University education as well as learn new behaviours and 'unlearn' things acquired in previous settings. Beyond this, the institution must take positive steps to provide enabling environment, so as to ease the adjustment process of new staff. If early socialization in their first academic appointments is deficient or unsuccessful, it could result in unmet expectations, dissatisfaction and lack of commitment on the part of new recruits.

Such academics are also likely to take more time to settle down, make more mistakes and may even become disillusioned with the job and then personal frustration and institutional disappointment may ensue. Personal observation reveals that University management sees value orientation and induction programmes as processes of completing paper work by new staff or a series of uncoordinated events during which new academics are hurriedly introduced to the general work environment, rather than offering them experiences that inspire and prepare them for the challenges of their new jobs.Yakubu(2000). An effective induction programme helps a new employee to feel assured and comfortable in the new work environment which is critical for early assumption of a new role. It is even more disturbing especially as it concerns effective staff integration, given the fact that the

early experiences of a new employee has important and lasting impact on their performance on the job and in some cases their willingness to remain in the institution. It is evident that value orientation of new lecturers is a very needful activity that should not be ignored. But the crucial issue of concern is that this has been inadequately done or not done at all for newly recruited staff in the public Universities in Plateau state Nigeria.

STATEMENT OF THE PROBLEM

Personal observations showed that there are complaints by stakeholders that there are no formal structured programmes to help new academic staff to integrate themselves properly into the University system. New lecturers seem to complain they lack the required guidance through formal value orientation and induction programmes for effective job performance. It is therefore not an exaggeration to see new lecturers in public Universities in North-central Nigeria confused and irritated trying to find out lecture venues or even to recognize their colleagues. This trend continues anytime new lecturers are employed leading to confusion, absenteeism and lateness to classes, poor feedback to students, personality issues, poor students application, leading to ineffectiveness in teaching, reduced level of research productivity and community service activities in the Universities.

Aim and objectives of the study

The aim of the study is to:

1. examine the extent of value orientation of new lecturers in public Universities in Plateau state Nigeria.
2. ascertain the extent of job effectiveness of new lecturers in public Universities in Plateau state Nigeria.
3. find out the relationship between value orientation for new lecturers and their job effectiveness in public Universities in Plateau state Nigeria.

RESEARCH QUESTIONS

1. What is the extent of value orientation of new academic staff in public Universities in North-central Nigeria?
2. What is the extent of job effectiveness of new academic staff in public Universities in North-central Nigeria?
3. What is the extent of relationship between value orientation and job effectiveness of new academic staff of public Universities in North-central Nigeria?

HYPOTHESIS

There is no significant relationship between value orientation and job effectiveness of new academic staff of public Universities in North-central Nigeria.

METHODOLOGY

The research design adopted for this study is the descriptive survey method. Descriptive survey design is concerned about the phenomenon of interest and pursues the factors that influence, affect, cause or relate to the phenomenon (Polit & Hungler, 1991). The design is attractive where control of subjects is quite difficult to achieve or implement It is justified on the ground that, someone could adopt one time observation, involving proximate and ultimate variables necessary for a study. The choice of the design is further informed due to its simplicity and ease of administration since it requires no more than the collection of two or more measures on a set of subjects at one point in time and requires no treatment or manipulation. The population of the study consists of all 7747 academic staff members and 2363 students of the public Universities in North-central Nigeria. 373 lecturers and 401 students using Yamene sampling formula was used to obtain the sample for the study. The Unit Heads, Heads of Departments and Deans of Faculties were included in the study due to their key administrative position and related activities as school administrators. Their roles among others are to monitor lecturers' efficiency and effectiveness in implementing the academic programmes and practices in their Universities. Two research instruments tagged 'Value Orientation Programmes and Job Effectiveness of New Academic Staff' (VOPJENAS) for lecturers and Academic Staff Effectiveness Questionnaire (ASEQ) for students of public Universities in North-central Nigeria were used to collect data for the study. The Mean, Standard Deviation were used to answer the research questions and Pearson Correlation coefficient was used to test the hypothesis at 0.05 level of significance.

Research Question One

What is the extent of academic staff value orientation in public Universities in North-central Nigeria?

Table 1
Mean and Standard Deviation Result on Academic Staff Value Orientation of Public Universities in North-Central Nigeria.

S/N	Item	N	Agg. Mean		Mean	Standard Deviation
1	Punctuality	2363	9.960	3.320	2.406	
2	Absenteeism	2363	10.560		3.520	2.424
3	Students' application	2363	13.920		4.640	3.027
3	Feedback to students	2363	17.270	3.454	4.317	
4	Personality	2363	42.510	3.270	7.694	
5	Academic calendar	2363	14.350	4.783	3.549	

Table 1 reveals the mean and standard deviation result on extent of academic staff value orientation in public Universities in North-central Nigeria. The result shows that all the items have Mean scores above the criterion mean of 3.00, indicating that punctuality, absenteeism, students' application, feedback to students, personality and academic calendar are affected by value orientation programmes for academic staff.

Hypothesis One
There is no significant relationship between value orientation and academic staff effectiveness in public Universities in North-central Nigeria

Table 2
Pearson Correlation of Relationship between University Culture of Value Orientation and Academic Staff Effectiveness in Teaching in Public Universities in North-Central Nigeria.

Variables	N	$\overline{X}$	SD	r	P value	Decision
Value orientation	2363	85.82	18.68	0.306	0.000	Accept Ho
Academic staff effectiveness	2363	363.59	85.95			

Table 2 shows the Pearson Correlation result analysis of relationship between University culture and academic staff effectiveness in teaching in public Universities in North-central Nigeria. From the table the Mean score of University culture ($\overline{X}$ = 85.82) is higher than that of academic staff effectiveness in teaching ($\overline{X}$ = 38.34). The result yielded r = 0.306, P < 0.05 which shows a weak positive relationship between the two variables. Since the P value (0.000) is less than 0.05 level of significance, the null hypothesis was rejected. It was concluded that there is a significant relationship between University culture and community services in public Universities North-central Nigeria.

DISCUSSION
The study examined the influence of University value orientation on academic staff job effectiveness in public Universities in North-central Nigeria. This was due to the perpetually observed problems of weak University culture and poor job performance of academic staff experienced in public Universities in North-central Nigeria. Results tend to show that University value orientation culture is weak and negatively influenced job effectiveness of academic staff of public Universities in North-central Nigeria and hence University goals are hardly attained.(Ogundele,2013)

Result also showed that only a few new academic staff received value orientation and induction in terms of staff handbook and condition of service while a very high percentage did not. This result showed negligence on the part of University management in carrying out their responsibilities. This has made many lecturers to remain ignorant of the basic terms of conditions of employment. It is not surprising that a good number of academic staff have never seen the University handbook and have remained ignorant of basic terms, and conditions of employment, values and practices. It is important that new lecturers be acquainted with all necessary information, history, rules and procedures available among other things. This will help new lecturers adjust to the demands of the University and the possibility of picking any negative tendencies prevalent in the system is reduced. The finding showed that new lecturers do not get adequate support from members to help them adjust to their new environment. Value orientation programmes for new lecturers are required to ensure that departmental practices are learning-friendly. With regards to information, majority of new lecturers were not given information booklets in the form of handbooks containing all they need to know about their University as well as their conditions of service. Personal experience shows that even the very senior lecturers that have spent years in

the University system have never seen the University handbook. Adequate information is vital to put the new staff on the right footing to know the mission, vision as well as procedures and practices of the Universities. The result corroborates Ajayi, Awosusi, Aroguntade and Ekundayo (2011), starting a new job in a new work environment presents series of challenges to an individual irrespective of previous experiences. Therefore, positive steps should be taken to cushion the effect of these demands and ensure an easy transition period for the new employee in terms of roles and responsibilities, organizational norms and relationship with work colleagues. The result accord well with Oke (2011) that the benefits of a thorough induction are: staff feels welcome and valued; accelerated success and effectiveness, improved personal and professional well-being; heightened job satisfaction; greater self-confidence and enhanced commitment to students, school and profession. There is no doubt that when academics are provided with an appropriate and well-planned induction programme they are more highly motivated, can extend their range of skills and knowledge, enabling them to be more adaptable, are less likely to waste the University's resources and staff time, and benefit from reduced levels of stress and anxiety.

The implications of the study is that value orientation programme is increasingly and strongly emerging as one of the most valuable instruments for employees' development in organizations. It has become obvious that it is beneficial to lecturers as a development method used to determine career interest, values, aptitudes, attitudes and behavioural changes. The University management is to identify opportunities and personal areas needing employees' improvement and to provide assessment information for identifying strengths, weaknesses, interests and values. In fostering value orientation activities, evaluation and feedback at different stages of lecturer career is a powerful tool for determining learning and development needs.

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