

Community College Developmental Education: A Correlational Study of Emerging Modalities

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Abstract

Developmental education course modalities in Florida were drastically changed in 2013 with the passage of Senate Bill 1720, which no longer required students to enroll in extra developmental courses. Developmental education courses must now be offered in a compressed, contextualized, or co-requisite instruction modality; or direct enrollment into a gateway course(1720-Education, 2013). This paper is a report of one part of a larger study that investigated the new modalities. Student learning styles and students' academic achievement in two of those modalities is explored in this paper. The theoretical framework of the study is Kolb's experiential learning theory (Kolb, 1984). Chi-Square correlational tests were conducted to examine the relationship between students' learning types and their final grades in compressed modalities of math developmental education. Though the results indicate no statistically significant relationships between the variables, a discussion follows that elucidates valuable recommendations and insights.

Introduction

In 2013, State Senator Bill Galvano of Florida introduced Senate Bill 1720 that passed into law on July 1, 2013. This bill allows for any student who entered a Florida public high school in 2003 or later and went on to graduate from a Florida public high school the ability to decline assessment for math and English and go straight into college level math and English(1720-Education, 2013). Active military students are also exempt from having to take assessment testing in Florida. In addition to letting students bypass assessment for developmental coursework, Senate Bill 1720made colleges and universities change the way they offer developmental courses. Students who are required to take developmental courses must now take them in one of several modalities, including modularized instruction, compressed instruction, contextualized instruction, co-requisite instruction, or as a gateway course (1720-Education, 2013).

While the success of developmental education has been questioned since the 1970s, the movement to eliminate or alter developmental education is fairly new. Within the last decade, lawmakers have argued that developmental education has not been successful in retention and graduation (Complete College America, 2014). With support from politicians, 32 states have either altered or eliminated their developmental education programs. In California, the California Basic Skills Initiative was created and designed to accelerate students' path through developmental education (Venezia & Hughes, 2013). Virginia and North Carolina have also accelerated developmental reading courses. The requirements of Senate Bill 1720 are the changes Florida choose to make.

Theoretical Framework: Kolb's Theory on Experiential Learning

This research was framed with Kolb's (1984) theory on experiential learning. Kolb (1984) named his theory, experiential learning theory, for two major reasons. The first reason was to credit Dewey, Lewin, and Piaget in building his theory from their work (Kolb, 1984).

The second reason is Kolb believed people learn through their experiences (Kolb, 1984).

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Kolb's experiential learning theory is broken down into four cyclical dialectics including concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). The four dialectics work continuously along two dimensions. Concrete experience and abstract conceptualization are part of the dimension where perceiving occurs. Reflective observation and active experimentation are part of the dimension where processing occurs. While these four dialectics are cyclical, a person can show a preference towards one of the dialectics from each dimension (Kolb, 1984). These preferences make up a learning style. These learning styles are accommodators, divergers, assimilators, and convergers.

Summary

In order to understand how compressing developmental education effects students' success rates, more research is needed (Venezia & Hughes, 2013). With Florida now requiring emerging modalities of developmental education as opposed to a traditional modality, it is imperative to understand student's relationships with these courses. Furthermore, this research specifically examined students learning styles and the relationships observed with academic achievement in compressed modalities of developmental math.

Literature Review

At least half of all students who enroll at community colleges will need some kind of developmental education (Bailey et al., 2010). There have been many definitions for developmental education over the years, including learning assistance and remedial education (Arendale, 2010). Remedial education was a term for courses that were intended to help students who lacked skills needed to be successful in college-level courses (Arendale, 2010). However, the term developmental education describes learning assisted courses as ways to enhance the skills that students already have (Arendale, 2010).

Compressed Developmental Education

As far back as the 1970s, students have had their frustrations with developmental courses and felt that advancing or accelerating these courses could help students be successful (Hampton, 1979). Students complain about the amount of time it can take to complete a developmental course sequence. Furthermore, believe the time spent in a developmental education course is not valuable and often will stop out before enrolling into a college-level course (Bailey et al., 2010). Currently, 32 states in America have made changes to the way their state colleges offer developmental education, with some states eliminating it completely (Complete College America, 2014).

According to Radford, Pearson, Ho, Chambers, and Ferlazzo (2012), intervention is needed in developmental education because students have not shown success at persisting in traditional developmental education courses. Compressed developmental education has shown some success (Radford et al., 2012). Compressed courses have multiple modalities, including accelerated courses. Another compressed course modality is combined courses where multiple developmental courses are combined into a single course (Radford et al., 2012).

Accelerated Course Modalities

Accelerated courses are being promoted because of students' not being successful when taking multiple developmental courses (Hern, 2012). When students have multiple transitional phases, it becomes harder to persist when the course does not count for credit (Hern, 2012). Accelerated courses have been shown to help with this problem (Hern, 2012).

Acceleration provides three ways for students to be successful in developmental course work (Venezia & Hughes, 2013). The first reason accelerating developmental courses can be successful is because it helps students avoid unnecessary developmental courses and allows enrollment in college-level courses faster. Secondly, courses are now aligned with college-level and technical courses to increase the rigor. Lastly, when developmental courses are accelerated, they usually will have some additional student support (Venezia & Hughes, 2013).

In New York, a study was conducted to examine the impact of accelerating developmental education courses and how that affects students (Hodara & Jaggars, 2014). The data collected for the study were taken from the CUNY system, which comprises 23 institutions, six of which are community colleges. From 2001-2007 students were placed into accelerated reading, writing, and math courses.

Overall, the results were positive for students. Students who participated in an accelerated reading or writing course were 9.7% more likely to enroll in college-level English when compared to students who took traditional developmental courses. Furthermore, those students were 6% more likely to complete the college-level English course.

Over the course of the study, students who took accelerated English courses attained more credits and degrees than the students who took traditional developmental courses (Hodara & Jaggars, 2014). While these results were positive for English, the results were not as positive for math. Students who participated in accelerated math programs did not show the level of success accelerated English students did (Hodara & Jaggars, 2014). However, while the students in math were not as successful as the students enrolled in accelerated English courses, their success rates did not decline. Overall the results from the CUNY system study showed positive results for students taking accelerated developmental education courses. Hodara & Jaggars (2014) believe the results from this study are positive for developmental education and could help enhance student retention and graduation.

Sheldon and Durdella (2010) conducted a study on the success of accelerated developmental courses when compared to traditional length developmental courses. The hypothesis for the study was that there would be no statistical or practical significance for students who participated in an accelerated modality of reading, writing, or math. Students for the study were from a suburban community college, and all students were enrolled in at least one developmental education course. The results for this study showed positive results for accelerated developmental education courses. Students who took part in the 8-9 week accelerated developmental writing course were 87% more successful than the students who took part in the 15-16-week traditional course; those students were 57% successful (Sheldon & Durdella, 2010). Furthermore, for math, students in the 8-9-week course showed a success rate of 65% compared to 51% for those who took the traditional length math course. Lastly, reading students were successful 77% of the time in the accelerated format compared to 66% of students taking the traditional length course (Sheldon & Durdella, 2010). According to Sheldon and Durdella, “the results of this study clearly demonstrate that for students enrolled at this particular community college, developmental course length is associated with statistically and practically significant differences in course success in developmental education courses and these differences are consistently observed across all categories of age, gender, and ethnicity” (p.52). Johnson and Rose (2015) examined faculty perceptions of accelerated courses at a university and two major themes arose. These themes were innovation in teaching and a sense of professional isolation. Participants of this study included faculty who taught in multiple disciplines and taught at least five traditional courses and five accelerated courses. Teaching accelerated courses, changed the perceptions of faculty members, including the overall way they felt about a quality education. Faculty also had a positive experience in teaching students in accelerated courses and observing their progression through the course. They also developed new innovative teaching methods that were designed for an accelerated course (Johnson & Rose, 2015). However, not all of the faculty experiences were positive.

Professional isolation is another theme that faculty who teach accelerated courses experience (Johnson & Rose, 2015). Some faculty who taught accelerated courses were isolated by other faculty because they did not believe in the teaching methods of the courses. The faculty members who were teaching the accelerated courses had the same beliefs before they began to teach accelerated courses. Furthermore, there was a sense of isolation from campus culture because the accelerated courses were offered during times when the campus was not populated. Ultimately, faculty felt somewhat split because while they felt secluded for teaching accelerated courses, they were still participating in meetings that were centered around their traditional course offerings (Johnson & Rose, 2015).

Hern (2012) argues that students’ having more exit points from course to course can create more opportunities for them to stop out and leave college. With students’ sometimes having to take as many as three developmental education courses, this leaves more time for them to stop out (Hern, 2012). Hern provides three recommendations for developmental education reform. Those include shortening developmental education sequences so that students are able to enroll in college-level courses faster. Secondly, institutions must not place so much emphasis on college assessment tests as placeholders for students’ academic success. Lastly, developmental education should be streamlined and include intentional support from multiple areas. While reform is needed, Hern (2012) does not feel that developmental education courses should be eliminated.

Combined Course Modalities

Developmental education is typically offered in reading, writing, and math. Many compression programs for developmental education have been successful in all three areas; however, reading and writing have shown the most success (Venezia & Hughes, 2013). According to Cafarella (2014), compressed math courses can be successful, but success requires students and faculty members who are prepared for the courses. For her study, 20 faculty members were interviewed regarding the different math modalities offered at Sinclair Community College in Dayton, Ohio. The three modalities of developmental math that are offered at Sinclair Community College are online, combined, and traditional. Faculty felt that the students who were successful in the combined modality also showed good time management and were also competent with technology (Cafarella, 2014).

Another combined program for math is the Path2Stats program in California (Hern & Snell, 2014). Los Medanos College in California examined that students were not successful in developmental courses because the students who were being placed into these courses were being singled out and discouraged. They believed that if students enrolled into college-level courses quicker then there would be a chance that they could have better success. In 2009, the institution created the Path2Stats program, which allowed students a quicker path to enrollment in college-level statistics. Students would take a one-semester, combined, introductory level statistics course without taking a placement test. After finishing this course, students would move directly into college-level statistics. The results from this program were very positive. Students who participated in the Path2Stats program were three times more likely to complete the college-level statistics course than students who got into the statistics course by way of a traditional developmental education sequence (Hern & Snell, 2014).

The Community College of Baltimore is another community college experimenting with compressing developmental education. This institution observed that success rates in its developmental writing courses had not been increasing since the late 1980s (Adams, Gearhart, Miller, & Roberts, 2009). Of the students taking the developmental writing courses, many never made it into Composition I and thus did not move forward to graduate. The Accelerated Learning Program (ALP) was created in the spring of 2007 to get students through developmental writing into college-level English. This program was available to students who volunteered for it. The modality of this program followed the combined method of compression by combining college-level courses and developmental courses. These courses were lengthier in time and were taught by the same instructor. This modality was offered to students who needed developmental courses and to students who placed directly into college-level English as well. The students who were college-ready did not have to take the supplemental writing course. Of the nearly 240 students who participated in this program, 63% of the students went on to pass college level English (Adams et al., 2009). Furthermore, students who participated in the ALP were 28% more likely to complete college-level English than students who did not participate in the ALP program (Jaggars et al., 2015).

The ALP program at the Community College of Baltimore worked because it removed the stigma of developmental courses by allowing these students directly into college-level courses (Adams et al., 2009). Additionally, these courses created learning communities by placing students who needed additional help alongside students who placed directly into college-level courses. Adams, Gearhart, Miller, & Roberts (2009) further state that this program saves the community college money because more students were successful in the courses; therefore, the college did not have to offer as many sections. Ultimately the ALP program at the Community College of Baltimore doubled the success rates of students and cut attrition rates in half (Adams et al., 2009).

Kolb's Experiential Learning Theory

Kolb's experiential learning theory is a processing information model that is widely administered in research today. Kolb's Experiential Learning Theory describes how learners perceive and process knowledge through the experiences (Kolb, 1984). Experiential Learning Theory developed through Dewey, Lewin, and Piaget's research. Furthermore, Kolb (1984) created a self-assessment test that determined what type of learner an individual may be.

Kolb's (1984) theory presents a cyclical model of stages. These four stages for learning are concrete experience, reflective observation, abstract conceptualization, and active experimentation. As a learner is having an experience, they will complete each stage of learning. As the learner is experiencing a stage, they will perceive the information during the concrete experience stage and abstract conceptualization stage. Furthermore, the learner will process the information while completing the active experimentation and abstract conceptualization stages (Kolb, 1984).

As previously mentioned, each stage in Kolb's theory is cyclical. During a learning opportunity, learners progress from one stage to the next, as a result of processing an experience. Concrete experience is defined by Kolb as learning that occurs in the physical or active participation during the experience. Following concrete experience in Kolb's model is reflective observation. Reflective observation is defined by Kolb as the visual transformation of the experience. The next stage in the model is abstract conceptualization. Abstract conceptualization is the cognitive perception of the experience. Lastly, active experimentation explains how a learner will apply the previous stages to when he or she will partake in the experience again through reflection.

Each stage is explained through either perceiving or processing information along two dimensions. Concrete experience and abstract conceptualization both perceive the experience that is occurring. During each stage, the learner is noticing, observing, and identifying what is taking place during the experience. Abstract conceptualization and reflective observation reflect when a learner is processing the information. During this stage the learner is making meaning of what is occurring.

Kolb (1984) explains that all people have a preference for the way in which they learn. Furthermore, Kolb's theory explains that everyone has a preference for how learners take in information and how they process information. Kolb labeled these learning preferences learning styles. The four learning styles mentioned are accommodators, divergers, convergers, and assimilators (Kolb, 1984).

Learners who show a preference towards active experimentation and concrete experience are considered accommodators (Kolb, 1984). Accommodators prefer working in group settings. These learners also show a preference in working with tangible items. Furthermore, accommodators will often take risks and act on their intuition. Rather than being logical, accommodators will trust instinct. Accommodators work well in business related fields (Kolb, 1984).

A learner who shows a preference for active experimentation and reflective observation is a diverger (Kolb, 1984). Divergers prefer feeling and watching an experience occur. These learners are creative. Divergers are generally well liked by other people. They can also be sensitive to other feelings. These learners are often artist, humanitarians, or work in sociological fields (Kolb, 1984).

Learners who prefer reflective observation and abstract conceptualization are assimilators (Kolb, 1984). Assimilators are logical like accommodators. However, these learners do not work well in groups and prefer learning individually. They also enjoy applying theory when making decisions. Like divergers, assimilators also have great imaginations. Assimilators often work in science and research related fields (Kolb, 1984).

Lastly, those who show a preference for abstract conceptualization and active experimentation are convergers (Kolb, 1984). Convergers enjoy experimenting with different ideas. These learners are excellent problem solvers and enjoy pragmatism. They differ from divergers because they are practical rather than imaginative. Convergers often find their professions in science, technology, engineering, or math related fields (Kolb, 1984).

The Kolb Learning Style Inventory (LSI) was developed to measure a learner's learning style. The instrument consists of 12 open-ended statements. Participants will rank the responses to the statements from 4 to 1, with 4 being the preferred choice. The scores are then added to determine the participant measures in each of the four learning stages. After scores are gathered for concrete experience, reflective observation, abstract conceptualization, and active experimentation, the researcher subtracts the reflective observation score from the active experimentation score and subtracts the concrete experience score from the abstract conceptualization score. Lastly, the final two scores plotted onto the Learning-Style Type Grid to determine a participant's learning style.

Methodology

Before Senate Bill 1720 was passed into law in Florida, students who tested into developmental math, reading, or writing could be required to take these courses by the college they were attending. Furthermore, developmental courses were offered in a traditional 16-week modality.

Senate Bill 1720 mandated a redesign of course modalities of developmental education into modularized, compressed, contextualized, corequisite, or as a gateway course (1720-Education, 2013). This research describes the relationships between Kolb's learning styles and academic achievement in an accelerated modality of developmental math and a combined modality of develop

Research Design

The research design for this study was quantitative, specifically Pearson's chi-square correlational test. The chi-square statistical test was conducted to determine if relationships exist between the variables. The dependent variable for this study was academic achievement. This was measured by collecting student final grades. The independent variable in this study was learning style. This was measured by administering the Kolb LSI to participants. The Pearson chi-square correlational test was selected because the research examined relationships between ordinal and nominal variables.

Research Question

Is there a relationship between learning style and academic achievement in a combined modality of developmental math and an accelerated modality of developmental math in a Florida state college in the 2015-2016 academic year?

In order to answer the first research question, the Kolb LSI was administered to students in an accelerated modality of developmental math and a combined modality of developmental math. After collecting data, a Pearson's chi-square correlation test was run to determine if there was a relationship between learning style and academic achievement in both modalities, and individual modalities.

Summary

Students who were enrolled in the college's combined developmental education courses and accelerated developmental education courses were surveyed with the Kolb LSI to determine their learning styles. Additionally, final grades were collected from the students to determine academic achievement. Once the data were collected, a Pearson's chi-square correlation test was conducted to analyze data, answering research question one.

Results

All participants in this study were enrolled in one of two modalities of compressed developmental math. The first course was a four-credit hour course that combined the traditional Developmental Math I, or MAT 0018C, and the traditional Developmental Math II, or MAT 0028C, and is now being offered as Developmental Math Combined or MAT 0022C. This course, when completed successfully with a C or better, offers a pathway into a college-level math course. The second course was a three-credit hour Developmental Math II course, or MAT 0028C, which has been shortened from a traditional 16-week format and is now offered as a seven-week course. This course also serves as a pathway to college-level math when successfully completed with a C or better.

All participants had a choice between the two modalities when enrolling. However, the differences in both modalities offer a different experience to the student. This research chose Kolb's Theory of Experiential Learning because Kolb explains that learning occurs through experience (Kolb, 1984). If the participants have different experiences in the two modalities, understanding relationships between these courses and Kolb's learning styles is important. The Kolb LSI was administered to the participants in order to determine their learning styles. Furthermore, the demographics of the participants and their perceptions of the developmental course modalities is important. These results provide more knowledge surrounding correlations between the participants' learning styles and their academic achievement in the developmental math modality that they were enrolled in.

Demographics

The population from which participants were gathered was 513 students, consisting of 318 enrolled in MAT 0022C and 232 enrolled in MAT 0028C. The total number of participants for this study was 121, a 24% response rate. However, of the participants, 95 completed both surveys, 16 declined to participate on the consent form, and 10 began but did not complete both surveys, accounting for missing data. Participants with missing data were not included in this research.

From those who responded, 58 (61.1%) were enrolled in MAT 0022C and 37 (38.9%) were enrolled in MAT 0028C. The age range varied among participants from 18 through 55. These results were not reported because they had no impact on the research questions. Participants who completed the survey, 61 (64.2%) responded they were female and 34 (35.8%) responded being male. For race, both Caucasian and Hispanic or Latino had the highest number of responses with 36 (37.9%), followed by African-American at 13 (13.7%), other at eight (8.4%), and Asian/Pacific

Islander at two (2.1%); no participant identified as Native American. Lastly, of all the participants, 43.2% indicated that they were the first in their families to attend college.

The majority of participants in the study were assimilators at 39 (41.1%). The second highest learning style found was divergers at 27 (28.4%). Convergers were the third highest learning style at 17 (17.9%). Lastly, 12 (12.6%) participants were accommodators. Furthermore, of the participants who were enrolled in MAT 0022C, 24 (41.3%) were assimilators, 14 (24.1%) were divergers, 11 (18.9%) were convergers, and nine (15.5%) were accommodators. Of the participants in the MAT 0028C course, 15 (40.5%) were assimilators, 13 (35.1%) were divergers, 6 (16.2%) were convergers, and three (8.1%) were accommodators.

The average grade received of all participants was a B. Additionally, this was most frequent grade with 28 (29.5%) participants receiving a B. The second highest grade received was an A at 26 (27.4%). These grades were followed by C at 23 (24.2%), D at 7 (7.4%), F at 6 (6.3%) and W or withdrawal at 5 (5.3%)

Research Question

A Chi-Square test of independence was conducted to determine relationships between final grades and Kolb's learning styles in an accelerated modality of developmental math and a combined modality of developmental math. The null hypothesis was there are no statistically significant relationship between Kolb's learning styles and final grades in both MAT 0022C and MAT 0028C at an alpha of .05. In order to meet the assumptions of Pearson's Chi-Square no more than 20% of cells should have an expected count of less than five. The assumptions for Pearson's Chi-Square have not been met because 17 (70.8%) cells have an expected value of less than five. Furthermore, there is not a statistically significant relationship between Kolb's learning styles and final grades in either MAT 0022C or MAT 0028C. Pearson χ^2 (df=15, N=95) = 17.31, p=.301, phi=.427. Likelihood ratio (df=15, N=95) = 20.378, p=.158. The phi statistic indicates a large effect size. Furthermore, this research fails to reject the null hypothesis. Table 1 provides these statistics.

Table 1. Chi-Square Test for Learning Styles and Final Grades

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.309 ^a	15	.301
Likelihood Ratio	20.378	15	.158
Linear-by-Linear Association	1.326	1	.249
N of Valid Cases	95		

A Chi-Square test of independence was conducted to determine relationships between final grades and Kolb's learning styles in a combined modality of developmental math. The null hypothesis was there are no statistically significant relationships between Kolb's learning styles and final grades in MAT 0022C at an alpha of .05. In order to meet the assumptions of Pearson's Chi-Square no more than 20% of cells should have an expected count of less than five. The assumptions for Pearson's Chi-Square have not been met because 21 (87.5%) cells have an expected value of less than five. Furthermore, there is not a statistically significant relationship between Kolb's learning styles and final grades in MAT 0022C. Pearson χ^2 (df=15, N=58) = 9.910, p=.825, phi=.413. Likelihood ratio (df=15, N=58) = 12.946, p=.606. The phi statistic indicates a large effect size. Therefore, this research fails to reject the null hypothesis. Table 2 provides these statistics.

Table 2. Chi-Square Test for Learning Styles and Final Grades in MAT 0022C

Cours		Value	df	Asymptotic Significance (2-sided)
MAT 0022C	Pearson Chi-Square	9.910 ^b	15	.825
	Likelihood Ratio	12.946	15	.606
	Linear-by-Linear Association	.019	1	.891
	N of Valid Cases	58		

A Chi-Square test of independence was conducted to determine relationships between final grades and Kolb's learning styles in an accelerated modality of developmental math. The null hypothesis was there are no statistically significant relationships between Kolb's learning styles and final grades in MAT 0028C at an alpha of .05. In order to meet the assumptions of Pearson's Chi-Square no more than 20% of cells should have an expected count of less than five. The assumptions for Pearson's Chi-Square have not been met because 23 (95.8%) cells have an expected value of less than five. Furthermore, there is not a statistically significant relationship between Kolb's learning styles and final grades in MAT 0028C.

Pearson χ^2 (df=15, N=37) = 18.811, $p=.222$, $\phi=.713$. Likelihood ratio (df=15, N=37) = 21.517, $p=.121$. The phi statistic indicates a large effect size. Therefore, this research fails to reject the null hypothesis. Table 3 provides these statistics.

Table 3. Chi-Square Test for Learning Styles and Final Grades in MAT 0028C

Course		Value	df	Asymptotic Significance (2-sided)
MAT 0028C	Pearson Chi-Square	18.811 ^c	15	.222
	Likelihood Ratio	21.517	15	.121
	Linear-by-Linear Association	6.013	1	.014
	N of Valid Cases	37		

Summary

The research question was answered by analyzing the data collected from the Kolb LSI, student final grades, and the additional survey. These data were analyzed through correlational tests to determine relationships between different learning styles and academic final grades in a combined modality of developmental math and an accelerated modality of developmental math. The results demonstrate that there were no statistically significant correlations between Kolb's learning styles and final grades in compressed modalities of developmental math. Furthermore, there were no statistically significant correlations between Kolb's learning styles and final grades in MAT 0022C. Lastly, there were no statistically significant correlations between Kolb's learning styles and final grades in MAT 0028C.

Discussion

Understanding relationships between student learning styles and academic achievement in compressed developmental education is imperative because the merging modalities are required in Florida. This research provides more knowledge surrounding the phenomenon of compressed developmental math modalities, student learning styles, and student achievement.

Research Question

This research question examined the relationship between Kolb's learning styles and final grades from participants enrolled in MAT 0022C and MAT 0028C during the summer term at a Florida state college. The null hypotheses (there are no statistically significant relationships between learning style and final grades in both MAT 0022C and MAT 0028C at an alpha of .05, there are no statistically significant relationships between learning style and final grades in both MAT 0022C at an alpha of .05, and there are no statistically significant relationships between learning style and final grades in both MAT 0028C at an alpha of .05) were all accepted.

This research has found that there are no statistically significant correlations or relationships between Kolb's learning styles and academic achievement in an accelerated modality and a combined modality of developmental math at a Florida state college in the 2015-2016 academic year. However, this does not infer that no association exists between the variables. It is possible that with a larger sample, relationships could be significant. Given that this study chose to examine only students at a state college in Florida, the research suggests only that the two variables, student learning styles and final grades, are independent at the particular state college in Florida.

Limitations

There are five limitations for this study, including the limited population of the study. This research focused only on students located in one state college in central Florida, however all students in Florida are impacted. Additionally, this research only examined two of the modalities the state now requires, accelerated and combined.

State of Florida requires that developmental education courses also be offered in modularized or contextualized formats, or as a gateway modality. Math is the discipline that was examined for this study, however, developmental education is also offered in reading and writing. Data were collected through an email sent out to all participants, creating another limitation. Lastly, the recent passing of Senate Bill 1720 into law accounted for limited research on the topic.

Recommendations

Senate Bill 1720 must continue to be examined. It is recommended that research be conducted on students who have chosen to bypass assessment testing upon entering college. Furthermore, a comparative study looking at the success rates of students who enrolled developmental education and those who did not enroll in developmental education is suggested.

Another recommendation for future research is to recreate this study with both reading and writing courses. As mentioned in the previous section, a limitation of this study was not examining the relationships between Kolb's learning styles and academic achievement in compressed developmental reading and writing courses. This research will create more knowledge on the differing disciplines effected by Senate Bill 1720.

Lastly, research conducted examining faculty is recommended. A qualitative study to gain insight on the new developmental course modalities from faculty may assist in understanding how these changes have affected the instructional methods of the courses. Understanding how the learning environment has changed is important to understand. Furthermore, examining college math and English courses qualitatively from faculty may help understand if there are more students enrolled these courses who are not prepared. This would create knowledge on the students who chose not to take an assessment test when entering the institution.

Conclusion

Developmental education in Florida has been systematically changed in two ways since Senate Bill 1720 passed into law in 2013. The first was the abolishment of required assessment by colleges and universities for any student who graduated from a Florida public high school in 2007 or later. The second change redesigned developmental education courses. Furthermore, developmental courses must now be offered in modularized instruction, compressed instruction, contextualized instruction, corequisite instruction, or as gateway courses. The purpose of this research was to provide knowledge on the topic of the new developmental education modalities.

The results of the research question found no statistically significant relationships between Kolb's learning styles and academic achievement in MAT 0022C and MAT 0028C. Furthermore, when looking at the modalities individually, no statistically significant relationships were found between the variables. It is important to note that while no relationships were found between final grades and Kolb's learning styles in this study, the research is implying only that the variables were independent at the state college in Florida where the research took place. Lastly, more research is recommended regarding relationships between personality types and academic achievement in all modalities and disciplines of developmental education.

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