Impact of Learning Assistance Center Utilization on Success

By Keith A. Wurtz

Programs that increase the level of engagement through programs like LACs also increase student persistence.

ABSTRACT: *A large number of community college students are developmental students. One of the most important challenges for community colleges today is to create programs that effectively educate community college developmental students. This study examines the effect of learning assistance centers on the success and persistence of students at a Southern California community college that utilized learning assistance centers to improve student success. Sequential logistic regression was used to predict the effects of learning assistance center utilization on success and persistence while controlling for self-selection and prior skill level. The results indicate that learning assistance center utilization increased the probability of success and persistence more than prior skill level and self-selection. Students who utilized a learning assistance center were three times as likely to be successful in their course and almost twice as likely to persist to the subsequent term. Implications for future practice include the recommendation for requiring students to utilize learning assistance centers.*

According to the Lumina Foundation for Education (Bailey & Alfonso, 2005), the most important issue facing community colleges today is improving the effectiveness of educating students in developmental courses. Many first-time community college students are not prepared for college-level work (CSS, RP Group, 2007; Levin & Calcagno, 2007; Minkler, 2002). Fifty-four percent of entering community college students in the United States have skills that are below college level in either math, reading, or English (Hoachlander, Sikora, & Horn, 2003). Similar to the National Association for Developmental Education's (NADE, nd) definition, developmental education students at the college have been conceived of as students who require assistance with coursework through strategies like tutoring.

Students who start their educational careers at a community college at a developmental or basic skills level are less likely to achieve their educational goals (Barnes & Piland, 2010). In addition, community college students often have to overcome additional challenges because of their diverse educational backgrounds in terms of age, SES (socioeconomic status), and ethnicity (Barnes & Piland, 2010; Killacky, Thomas, & Accomando, 2002; Smith, 2010; Smith, MacGregor, Matthews, & Gabelnick, 2004). Moreover, due to low graduation and persistence rates to bachelor degree completion, community colleges are under pressure to improve student performance (Barnes & Piland, 2010; Keup, 2005; Tinto, 2006). In order to improve student persistence rates, community colleges have employed a variety of strategies, one of which is the use of tutoring centers (Keup, 2005).

One of the strategies that has been used to meet the needs of these large numbers of students requiring support in developmental education has been to create learning assistance centers (LACs). For the purposes of this study, a definition of LACs was adapted from Arendale's (2007) glossary of developmental education and learning assistance terms:

> A designated physical location on campus that provides an organized, multifaceted approach to offering comprehensive academic enhancement activities, tutorial and study skills assistance, provides support to a wide array of academic disciplines, and a place that offers help to any student experiencing academic difficulties. (p. 22)

LACs are believed by many to be extremely important to the academic success of students in community colleges because developmental students often enroll in transfer and occupational courses at the same time that they are enrolled in developmental courses (Higbee, Arendale, & Lundell, 2005). Equally important, there is considerable evidence suggesting that programs that increase the level of engagement through programs like LACs also increase student persistence (Higbee et al., 2005).

LACs often employ numerous learning strategies that may include tutoring, workshops, support for classroom instruction, and open accessibility, and they may involve academic partnerships (Boylan, Bonham, & White, 1999; Burns, 1994; Kane & Henderson, 2006; Manalo & Leader, 2007). Furthermore, the learning strategies used in learning centers can involve a variety of metacognitive

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strategies, questioning and probing strategies, study skill strategies, contextual learning strategies, and learning assessments (MacDonald, 2004). LACs can also take many forms. For instance, they can have a subject specific focus like reading, writing, or math. Finally, one of the most important components of an LAC is that students interact with other students (Mendez, 2006). In this study LACs include tutoring that involves individual and group support for study, notetaking, writing, and math skills (Wilson & Arendale, 2011).

One challenge for colleges with LACs is that not all students who need the support utilize the centers (Higbee et al., 2005). For example, centers at one university reported use at approximately 25% (Manalo & Leader, 2007). Even though few students utilize LACs, a large number of entering community college students in the nation do want to receive support in their courses. For instance, 44% of males and 52% of females would like to receive help in math. In addition, 37% of males and 44% of females would like to receive instructional support in one or more of their courses (Noel-Levitz, 2007).

In order to identify the actual impact of LACs on academic success, research needs to move beyond self-reported data (Duranczyk, Goff, & Opitz, 2006). Moreover, many of the theories that developmental education is based on were developed from research at four-year institutions (Higbee et al., 2005). Similar research needs to be conducted at community colleges in order to identify the most effective learning strategies (Berson & Younkin, 1998; Higbee et al, 2005). For instance, Astin's (1999) developmental theory of involvement was largely based on research conducted at four-year institutions (Higbee et al., 2005).

Current research examining the impact of LAC use on academic achievement does indicate an effect on academic success. However, much of this research has not controlled for self-selection or prior skill level. For instance, a study examining the pass rate of 211 students indicated that the students who voluntarily chose to access the learning center had a statically significantly higher pass rate in the statistics course than the 1,168 students who chose not to utilize the center (Manalo & Leader, 2007). A common criticism of this type of research is that students who are motivated are more likely to access a learning center, and this is the reason for the higher success rates (Hotchkiss, Moore, & Pitts, 2006). Accordingly, research examining the role that motivation plays in academic achievement is essential in order to determine whether motivation or the intervention is the reason for the increased success rates (Higbee et al., 2005).

Another gap in the research examining the impact of LAC use on academic success arises from the use of self-reported data. For instance, research examining the effect of tutoring services on grades for underrepresented students did not show that grades were positively impacted for students utilizing a math learning center because the study was based on self-reported data (Duranczyk, Goff, & Opitz, 2006). On the other hand, Duranczyk et al. (2006) also examined the relationship between confidence in mathematics and activity in the Math Center. The results indicated that students who received B and C grades were more likely to have an increase in confidence.

As mentioned previously, prior skill level is also an important consideration when examining the impact of programs on academic success. For example, past research has indicated that students who earned As in a math course were less likely to use LACs (Duranczyk et al., 2006).

Finally, there is not enough research in the area of program effectiveness at community colleges (Bailey & Alfonso, 2005). In an extensive review of the research on community college programs, the Academic Senate for California Community Colleges (Academic Senate for California Community Colleges [ASCC], 2003) only identified

> *One of the most important components of an LAC is that students interact with other students.*

one community college where sufficient research had been conducted in the area of developmental program effectiveness. Moreover, there was a lack of methodologically sound research to help inform policy makers about effective programs (Levin & Calcagno, 2007). In order to provide developmental education that effectively impacts students, colleges need to implement programs that are supported by research (Higbee et al., 2005).

The purpose of this study is to help inform theory and practice by employing quantitative research techniques while controlling for self-selection and prior skill level. With that in mind the following research questions were examined:

1. What is the effect of utilizing LACs on success while controlling for prior skill level and self-selection/motivation?

2. What is the effect of utilizing LACs on persistence while controlling for prior skill level and self-selection/persistence?

Method

Data Collection

The data for this study was compiled from two different databases. Data concerning collected the time students spent in the centers, the section for which the student was attending, and the reason the student was at the center were collected in the first database.

The second database was the California Community College Office Management Information System (COMIS). COMIS was used to track grades in individual courses as well as demographics.

Participants

Fall 2005 students were included in the study if they earned a grade on record (GOR) in a section where at least one student who had a GPA prior to Fall 2005 utilized an LAC at least once. A GOR refers to one of the following grades: A, B, C, D, F, Non-Credit (NC), Credit (CR), Incomplete (I), or Withdrawal (W).

A section is a specific instance of a course offered during a specific term. More than one section may be offered for a given course during a given term. Comparing students from the same section who accessed an LAC to those who did not provided the ability to control for time, day, and instructor.

The resulting sample included 12,124 students; 56% did not utilize an LAC, and 44% of the students did utilize an LAC. When comparing those who utilized the LACs to those who did not, females were more likely to utilize a success center (65%) than to not utilize an LAC (61%). Hispanic students were also more likely to utilize an LAC (46%) than not use an LAC (41%), and students who were 19 years old or younger were more likely to use the LACs (28%) than not utilize the LACs (19%). On the other hand, students 20 years or older appeared less likely to utilize the LACs.

Students who earned a GOR in 1,310 sections utilized an LAC. This represents 67% of the 1,953 sections offered to students in Fall 2005. Students were accessing the success centers for support in accounting, anthropology, art, astronomy, biology, business, child development, chemistry, computer information systems, communication studies, correctional science, economics, English, English as a second language (ESL), guidance, history, math, music, nutrition, nursing, philosophy, physics, political science, psychology, reading, sociology, and Spanish. Some of these disciplines had requirements for students to use the LAC for a certain number of hours for the semester. For example, English, ESL, math, reading, and language courses like Spanish have requirements for the amount of time spent in the LACs.

Many of the students utilize the LACs because they are required to, and many use the LACs because of choice and self-selection. Furthermore, some instructors, in particular adjunct faculty, do not always enforce the LAC utilization requirement. To control for this a measure of section participation rate (i.e., self-selection) was created and included in the sequential logistic regression analyses.

Measures

Outcomes. Academic achievement has been defined in many different ways. For instance, it has been defined as grade point average (GPA) and

term-to-term persistence (Hotchkiss et al., 2006). Academic achievement has also been defined as passing rate and/or success rate (Mendez, 2006). For the purposes of this study persistence refers to students who earned a grade on record (GOR) in the Fall 2005 term and subsequently earned a GOR in the Spring 2006 term. In addition, this study also uses the RP Group (Research and Planning Group for California Community Colleges) definition of success which refers to earning a grade of A, B, C, or CR divided by the number of grades earned on record, A, B, C, D, F, CR, NC, I, and W (RP Group, 2001).

Candidate predictors. As mentioned previously, section participation rate was created to control for self-selection, that is, whether or not students choose or are required to utilize the LACs. Section participation rate was created by dividing the number of students in a section who utilized an LAC by the number who earned a grade on record in the section. For instance, in the 1,310 sections the participation rate ranged from 1% to 100%, the mode was 13%, the median average was 16%, and the mean average was 28%. The data was tested for assumptions of normality. Requirement for normality was met even though the distribution is slightly positively skewed (see Table 1). Additional information on how the assumptions were met can be obtained by contacting the researcher.

Finally, GPA was used as a predictor to control for prior skill level. The students' GPA prior to the Fall 2005 term included all prior course work at the community college and all other colleges. In order to control for skill level, students without a GPA prior to the Fall 2005 semester were excluded from the analysis. Twenty-five percent, or 4,013 of the 16,137 students, did not have a GPA prior to Fall 2005. Replacing the missing GPAs was not an option because students who did not have a GPA prior to Fall 2005 (M = 2.08, SD = 1.55) had a lower GPA (statistically significant) in Fall 2005 than students who had a GPA prior to Fall 2005 (M = 2.32, SD = 1.45), $t(5,710.1)$ = -8.460, $p < .001$, d = .17 (Harrell, 2001; Tabachnick & Fidell, 2007). In addition, students who did not have a GPA prior to Fall 2005 (M = .26, SD = .439) were not less likely to utilize an LAC at a statistically significant level than students who did have a GPA prior to Fall 2005 (M = .27, SD = .444), $t(16,090.7,)$ = -1.848, p = .065, d = .02.

Analyses. Two sequential logistic regression analyses were conducted to identify whether there was a statistically significant increase in success and persistence when LAC use was included after controlling for prior GPA and section participation rate (Tabachnick & Fidell, 2007). Specifically, the difference between the two models was evaluated to determine if LAC utilization significantly added to the prediction of success and persistence above that with prior GPA and section participation rate.

> *Section participation rate was created by dividing the number of students in a section who utilized an LAC by the number who earned a grade on record in the section.*

Results

Success Rate

The data for the model was screened for assumption violations, including multicollinearity, the number of candidate predictor variables required to decrease the probability of over fitting, and multivariate outliers (George & Mallery, 2006; Harrell, 2001; Mertler & Vannatta, 2005; Pallant, 2005; Tabachnick & Fidell, 2007). The assumptions for multicollinearity and the number of candidate predictor variables were both met. Specifically, the predictor variables were not highly correlated with each other and there were not too many candidate,

predictor variables in relation to the number of cases. However, Mahalanobis' Distances identified 4,007 records out of 30,123 or 13% of the cases as outliers, which were excluded from the analysis. Outliers are identified using chi-square values that are significant at p <.001. With 3 degrees of freedom the chi-square criteria was 16.27. No differences were found between the results of the logistic regression models with and without the outliers (Mertler & Vannatta, 2005).

Based on the chi square, prior GPA and section participation rate were statistically significant predictors of success, X^2 (2, N = 26,116) = 2,406.9, $p < .001$ (see Table 2). The addition of LAC utilization indicated improvement, X^2 (3, N = 26,116) = 3,228.3, $p < .00$, indicating that the predictors, as a set, reliably distinguished between success and nonsuccess. The Hosmer-Lemeshow test yielded a X^2 (8) of 77.9 and was statistically significant ($p < .001$), suggesting that the model does not fit the data well. However, when interpreting the Hosmer-Lemeshow test a large sample size may inflate the chi-square statistic resulting in a higher likelihood of a statistically significant result (Mertler & Vannatta, 2005; Tabachnick & Fidell, 2007). Accordingly, classification tables were used to assess goodness of fit or the proportion of cases that were classified correctly (Mertler & Vannatta, 2005). The overall prediction accuracy for this model was 65%: 84% for successful course completions and 36% for nonsuccessful course completions. The overall prediction accuracy increased from 61% to 65%.

According to the results illustrated in Table 2 (p. 6), prior GPA, section participation rate, and LAC utilization all predicted course success. Based on McFadden R (see DesJardins, 2001 for formula on interpreting negative coefficients), the amount of variance in course success accounted for by the model increased from 15% to 17% when success center utilization was added to the model. The overall prediction accuracy for this model increased from 65% to 68% when LAC utilization was added to the model. In addition, the prediction accuracy for nonsuccessful course completions increased from 36% to 43% and the successful course completion prediction accuracy remained the same at 84%. The odds of success were over three times more likely if a student used an LAC, over two times more likely if a student was in a section where the participation was low or self-motivation was high, and almost two times as likely for students who had higher GPAs in their prior college work.

Persistence Rate

The data for the model was screened for assumption violations, including multicollinearity, the number of candidate predictor variables required to decrease the probability of over-fitting, and multivariate outliers (George & Mallery, 2006;

Table 1

Descriptive Statistics, Skewness, and Kurtosis Standard Error Ratios for Section Participation Rate (N = *1,310*)

Variable	Min	Max	*M*	*SD*	Skewness		Kurtosis	
					Stat.	Ratio	Stat.	Ratio
Section Participation Rate	.01	1.00	.28	.266	1.091	16.0	−.116	−.859

Note. Ratios were calculated from the standard errors (*SE*) of the skewness and the kurtosis statistics. The ratio for each skewness and kurtosis statistic was calculated by dividing the statistic by the corresponding standard error (Tabachnick & Fidell, 2007).

Harrell, 2001; Mertler & Vannatta, 2005; Pallant, 2005; Tabachnick & Fidell, 2007). The assumptions for multicollinearity and the number of candidate predictor variables were both met. Specifically, the predictor variables were not highly correlated with each other, and there were not too many candidate predictor variables in relation to the number of cases. However, Mahalanobis' Distances again identified six records out of 12,126 of the cases as outliers, which were excluded from the analysis.

A sequential logistic regression analysis was also performed to assess how well LAC utilization predicted persistence. Based on chi square, prior GPA and section participation rate were statistically significant predictors of persistence (see Table 3, p. 8). The addition of LAC utilization indicated improvement, indicating that the predictors, as a set, reliably distinguished between persistence and nonpersistence. The Hosmer-Lemeshow test yielded a X^2 (8) of 79.2 and was statistically significant ($p < .001$), suggesting that the model does not fit the data well. However, as mentioned before, when interpreting the Hosmer-Lemeshow test a large sample size may inflate the chi-square statistic resulting in a

higher likelihood of a statistically significant result (Mertler & Vannatta, 2005; Tabachnick & Fidell, 2007). Due to this, classification tables were used to assess goodness of fit or the proportion of cases that were classified correctly (Mertler & Vannatta, 2005). Again using McFadden R the amount of variance in persistence accounted for by the model increased

> ## *The odds of persistence were two times more likely if a student used an LAC.*

from 8% to 9% when success center utilization was added to the model. The overall prediction accuracy for this model remained at 63% when LAC utilization was added to the model. However, the prediction accuracy for nonsuccessful course completions increased from 36% to 42%, whereas the successful course completion prediction accuracy decreased from 76% to 72%.

According to the results reported in Table 3 (p. 8), prior GPA, section participation rate, and LAC utilization all predicted persistence. The odds of

persistence were two times more likely if a student used an LAC, and indicated little change when self-motivation and prior GPA were high.

Discussion

This study makes some important contributions to the literature on the effects of success center utilization on success and persistence at community colleges. First, even though prior skill level and motivation have a statistically significant effect on success and persistence, success center utilization has more of an impact on student success and persistence than prior skill level and motivation. Since such a large proportion of entering students require developmental support, LACs are viable options for community colleges (CSS, RP Group, 2007; Levin & Calcagno, 2007; Minkler, 2002). If learning assistance centers serve from 25% of the students enrolled at the college on the low end (Manalo & Leader, 2007) to 55% on the high end (Hartnell College, 2007; Kane & Henderson, 2006) then learning assistance centers can reach a high proportion of students needing developmental support.

Second, the research conducted here moves beyond self-reported data by employing logistic regression to examine the impact of learning center utilization on academic success as recommended by Duranczyk et al. (2006). The data collected and examined permitted the exploration of whether the behavior of utilizing an LAC had impact on success and persistence while controlling for prior skill level and motivation.

The finding that LACs utilization increases the probability that a student will persist even more than their own self-motivation, is strong evidence that promoting LAC utilization is an important strategy on community college campuses. In addition, Astin's (1999) developmental theory of involvement suggests that although motivation is an important component of persistence, the behavioral aspects of utilizing an LAC appear to have a larger impact on persistence.

Finally, in both sequential logistic regression models that predict success and persistence, the beta values for section participation rate moved from positive to negative after the addition of LAC utilization. This suggests that students in sections where they are not required to use LACs are more likely to be successful or persist. Moreover, this finding also indicates that self-motivation does play a role in LAC utilization, success, and persistence.

Implications for Practice and Future Research

Students are three times more likely to successfully complete their course if they obtain help for the course in an LAC and two times more likely to persist to the subsequent term. The implications of these findings strongly suggest that with 54%

Table 2
Sequential Logistic Regression Summary for Success Rate **(N = 26,116)**

Predictor	B	Wald X^2	p	Odds Ratio	95% CI for Odds Ratio
Block 1					
GPA Prior to Fall 2005	.629	2150.840	< .001*	1.876	1.827, 1.927
Section Participation Rate	.212	16.387	< .001*	1.237	1.116, 1.370
Constant	−.873	703.945			

Test	X^2	df	p	McFadden R^2	95% CI for Odds Ratio
Overall Model Evaluation					
Enter Method	2,406.900	2	<.001*	0.146	
Block 2					
GPA Prior to Fall 2005	0.620	2033.613	< .001*	1.860	1.810, 1.910
Section Participation Rate	−1.009	207.336	< .001*	0.365	0.318, 0.418
Success Center Utilization	1.175	745.668	< .001*	3.237	2.975, 3.521
Constant	−0.830	617.702			

Test	X^2	df	p	McFadden R^2
Overall Model Evaluation				
Enter Method	3,228.25	3	<.001*	0.170

*$p < .001$.

of entering community college students needing additional support and the myriad challenges faced by community college students, requiring students to utilize an LAC can help improve their success and persistence rates (Barnes & Piland, 2010; Hoachlander et al., 2003; Killacky et al., 2002; Smith, 2010; Smith, MacGregor, Matthews, & Gabelnick, 2004).

A critical issue facing community colleges is improving the effectiveness of how the institutions educate developmental students (Bailey & Alfonso, 2005). Requiring students to utilize LACs that provide an organized approach to comprehensive academic enhancement activities in a wide array of academic disciplines is one important component in student learning and development. Moreover, this type of support needs to be provided to students enrolled in any discipline because there is considerable evidence suggesting that developmental students also enroll in transfer and occupational courses (Higbee et al., 2005). Although it is not practical to require every student at a college to utilize the support services provided by LACs, LACs do need to be available to all students. In addition, institutions need to explore in what areas requirements for utilizing LACs need to be developed.

Further research in this area needs to explore the relationship between self-selection/motivation by demographic variables such as race and student enrollment status (e.g.: first-time college student) on the use of success centers and their impact on academic achievement (Higbee et al., 2005). Moreover, Astin (1999) argues that research examining different forms of involvement (e.g.: success center utilization) needs to examine whether different student characteristics produce similar or different outcomes. Finally, future research needs to also examine how time spent utilizing LACs or activity engaged in at the learning assistance affects success and persistence. Equally important is the relationship by course and whether or not there are differences by subject as well as specific course requirements.

Limitations

One limitation to the current study is that motivational and other barriers may occur at different rates depending on ethnicity, age, gender, and enrollment status (Higbee et al., 2005). Authors first have focused on the role motivation plays in predicting success in relation to prior skill level and LAC utilization prior to considering other variables. Second, the research conducted here only includes LACs at one Southern California community college and does not necessarily reflect learning centers across the state or the country. Finally, in order to control for prior skill level many first-time college students were excluded from the study.

Conclusion

The most important issue facing community colleges is improving the effectiveness of how community colleges educate developmental students (Bailey & Alfonso, 2005). Requiring students to utilize LACs that provide an organized approach to comprehensive academic enhancement activities in a wide array of academic disciplines is one important component in student learning and development. Moreover, this type of support needs to be provided to students enrolled in any discipline because there is considerable evidence suggesting that developmental students also enroll in transfer and occupational courses (Higbee et al., 2005). Although requiring every student at a college to utilize the support services provided by LACs may not be practical, institutions should develop specific policies for learning assistance/success center use.

Students are three times more likely to successfully complete their course if they obtain help for the course in an LAC and two times more likely to persist to the subsequent term. The implications of these findings strongly suggest that, with 54% of entering community college students needing additional support and the additional challenges faced by community college students, requiring students to utilize an LAC can help improve their success and persistence rates (Barnes & Piland, 2010; Hoachlander et al., 2003; Killacky et al., 2002; Smith, 2010; Smith, MacGregor, Matthews, & Gabelnick, 2004).

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Table 3

Sequential Logistic Regression Summary for Persistence Rate (N = *12,120*)

Predictor	B	Wald X^2	p	Odds Ratio	95% CI for Odds Ratio
Block 1					
GPA Prior to Fall 2005	.255	197.309	< .001*	1.291	1.245, 1.337
Section Participation Rate	.317	16.892	< .001*	1.373	1.180, 1.598
Constant	.392	158.577			

Test	X^2	df	p	McFadden R^2	95% CI for Odds Ratio
Overall Model Evaluation					
Enter Method	213.684	2	<.001*	0.088	
Block 2					
GPA Prior to Fall 2005	.240	173.217	< .001*	1.272	1.227, 1.318
Section Participation Rate	-.332	11.390	< .001*	0.718	0.592, 0.870
Success Center Utilization	.658	112.513	< .001*	1.930	1.710, 2.180
Constant	.227	24.528			

Test	X^2	df	p	McFadden R^2	
Overall Model Evaluation					
Enter Method	331.536	3	<.001*	0.095	

*p < .001.

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