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# International Journal of Self-Directed Learning

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## *Preface*

This issue presents quantitative and qualitative studies of self-directed learning targeting not only a diversity of students such as freshmen (Curry, Mynard, Noguchi, & Watkins), traditional and nontraditional undergraduates (Plews), and online doctoral students (Van Duyne; Ginnings & Ponton) but also teachers as learners (McCarthy & James). The breadth of populations and methods presented reflects the diversity of research in this field. I thank the authors for sharing their work with the *IJSDL* readership.

Michael K Ponton, Guest Editor

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## A Tribute

Dr. Richard Durr has been a member of the *IJSDL* editorial board since Fall 2009; this issue will be his last as a board member. Because of this and his extensive work in the field, we would like to summarize in brief manner his varied contributions to furthering SDL as a method of learning, topic of research, and focus of organizational efforts.

Dr. Durr's contributions to SDL began with his 1992 doctoral dissertation *An Examination of Readiness for Self-Directed Learning and Selected Personnel Variables at a Large Midwestern Electronics Development and Manufacturing Corporation* with Professors Paul and Lucy Guglielmino at Florida Atlantic University serving as committee members (Lucy was his co-chair). His doctoral work was the beginning of 25 years of research focusing on developing self-directed learning readiness and how this construct is related to constructs/variables such as culture and occupation.

Dr. Durr worked 25 years for Motorola, serving in different management capacities and facilities, and retired as Director of Learning and Development at the Boynton Beach, FL, facility. His SDL Laboratories at Motorola's Scottsdale, AZ, and Boynton Beach facilities were exemplars for the industry. In fact, due to widespread interest from outside organizations that sent personnel to visit and observe, Motorola had to restrict visitors to Fridays only and on a space-available basis. These labs were highlighted at meetings of the International Center for Quality and Productivity's Conference on Tools and Technology for Self-Directed Learning; conferences were specifically held in West Palm Beach, FL, and Scottsdale in order to allow attendees to visit the labs.

Dr. Durr was generous in sharing his expertise with his community. He and Prof. Lucy Guglielmino worked with the Palm Beach County School Board and Teachers' Union to develop a system enabling experienced teachers to create their own self-directed learning projects designed to improve their practice. The teachers could then earn their required inservice points through meaningful, targeted, self-designed activities rather

than having to choose among packaged or generic options that might not address their developmental needs.

Over the years, he has served as an adjunct professor at Palm Beach Atlantic University as well as Florida Atlantic University. He has published not only in this journal but also in several proceedings of the International Symposium of Self-Directed Learning, in the *Human Resource Development Quarterly*, and in the *ASTD Handbook of Training Design and Delivery*. Dr. Durr coordinated the SDL Symposia from 1999 to 2002, held in Phoenix, AZ, and Boynton Beach. He has also served as a board member and Webmaster for the International Society of Self-Directed Learning.

Dr. Durr was the 2008 recipient of the Malcolm Knowles Memorial Self-Directed Learning Award, recognizing his extensive contributions to the field of SDL. We recommend the readership review the august group of recipients of this award at http://www.sdlglobal.com/award-winners.

We want to add that on top of his professional achievements, Richard's sense of humor, friendliness, and willingness to help are second to none. We will miss interacting with him each year at the symposium, but we hope in the future he will attend more times than not as his new activities and projects allow.

Thank you, Dr. Durr, for advancing the field of self-directed learning.

Lucy Madsen Guglielmino, Editor
Michael K. Ponton, Guest Editor

# *International Journal of Self-Directed Learning*

## CONTENTS

# A PRELIMINARY STUDY OF ONLINE DOCTORAL STUDENT SCORES AND THE SELF-DIRECTED LEARNING READINESS SCALE

## Ingrid Marie Van Duyne

Technology is increasing in popularity for instruction in higher education institutions. Evidence is limited in demonstrating its use as an effective teaching method. Perceptions regarding the best mode for learning vary. Instructors can help students in the learning process by being aware of varied learning styles. A learning style is a viewpoint on the most comfortable mode of instruction. Technology is one mode of instruction and has its place with certain types of learners as do traditional classrooms. A review of literature does not reveal any prior studies with association between choice of programs and learning preference scores. Studies were found that demonstrated higher education delivery choices pertaining to generation but not specifically to learning preference. The purpose of this study was to determine if there was a difference in self-directed learning readiness (measured by the Self-Directed Learning Readiness Scale) between two levels of student learning preferences (i.e., traditional and online learning); resultant findings suggest no statistical difference.

**Keywords:** learning style, higher education, cyberlearning, SDLRS

More than 3.9 million higher education students took one or more online courses in 2007. This was a 12% increase from the prior year. This correlated with a growth of 1.2% in the general higher education student population during a similar period (cf. Allen & Seaman, 2005). In 2013, an estimated half of all college students reported taking an online class (Pirani, 2013). Though cyberlearning is a prevalent means of instruction, there is limited evidence that the use of online teaching is a proven method for teaching (Kirschner & Karpenski, 2010). Perceptions vary as to what is the best mode for learning, whether it is traditional, face-to-face instruction as in the past or cyberlearning. Recent studies found no statistical significance for attrition or grades with online versus face-to-face instruction (Crary, 2014) although student satisfaction was correlated with confidence in technology if taking hybrid courses (Elkins, 2015) and overall better satisfaction if feeling connected to other students and instructors (Crary, 2014; Elkins, 2015). The question as to best mode of learning is not new as evidenced by two educators Diaz and Cartnal (1999). They discussed the need for educators to be aware of students' varied learning styles and thus assist in the learning

process. A learning style is a student's perspective on the most ideal personal mode of instruction. This study explored if enrollees in online doctoral programs had higher readiness for self-directed learning in traditional versus online programs.

Cyberlearning is one mode that may be appropriate for certain learners just as the traditional classroom has its place with certain types of learners. The mode of delivery and classroom course content ought to reflect the course requirements, integration of appropriate technology, and especially the needs of the students (Soloway, Norris, Blumenfeld, Fishman, & Marx, 2001). Diaz and Cartnal (1999) performed a correlational analysis to compare student learning styles of two online health education classes with an equivalent on-campus class. The conclusion was that it is important for faculty adapting a traditional course to be used online to first administer a student learning style inventory to their traditional and distance students. It was also concluded that knowledge of student learning preferences was important for designing class delivery methods, selecting proper technology, being sensitive to different student learning preferences, and assisting in general class preparation (Diaz & Cartnal, 1999).

The virtual teacher is the facilitator and no longer the primary source of knowledge in the provision of student learning (Leneway, 2014). Teachers and institutions play an important part in the effectiveness of a delivery mode. Building a sense of community is important for online learning as it mimics face-to-face or traditional learning with a sense of belonging (Randolf & Crawford, 2013). The need for student and teacher to set mutual goals and communicate continues. Poor learning outcomes can occur if educators are not sensitive to demographics (Williams, 2013). Communication is a central theme for student satisfaction in learning (Kunin, Julliard, & Rodriguez, 2013; Lemoine & Richardson, 2013).

The Self-Directed Learning Readiness Scale (SDLRS) is a quantitative psychometric tool (Guglielmino, 1978) that measures abilities, attitudes, and characteristics to demonstrate readiness for self-directed learning. For change to be possible, students need communication and an understanding of preferences and how personal readiness can affect learning (Guglielmino & Guglielmino, n.d.; Lemione & Richardson, 2013). Self-understanding is key, yet theories on learning styles are not definite (Curry, 1983; Sternberg & Grigorenko, 1997).

Learning style theories are based on two varied positions. Some theories base learning on physiology (Sternberg & Grigorenko, 1997) and others are based on personality (Curry, 1983). A consideration is how learning style and teaching style are subcategories of the activity-centered approach, which is part of cognitive theory (Sternberg & Grigorenko, 1997). This approach involves the Curry Onion Model (Curry, 1983), which is a standard in classifying learning styles (Gordon & Bull, 2004). The layers represent the different components of a person's characteristics or style. Just as there are different learning styles, there are also different teaching styles (Sternberg & Grigorenko, 1997). For this reason, the SDLRS is helpful in studying readiness for self-directed learning as it measures the stated important characteristics.

A literature review was performed to discover whether any prior studies found an association between choice of programs and learning preference scores. A review of the literature did not reveal such a study. Studies were found that demonstrated higher

education delivery choices pertaining to generation but not specifically to learning preference (Williams, 2013). A review of the literature correlated a conclusion from Williams (2013) that future research should explore the learning preferences and expectations of specific generations such as Millennial students otherwise known as Generation Y or the Net Generation.

A profile of doctoral online scores revealed that readiness should inform choice versus preference for mode of instructional strategy (online versus traditional), as demonstrated by high SDLRS scores, during the study. Using a quantitative descriptive design, it can only be hypothesized as to a causal relationship or an interrelationship between variables (Portney & Watkins, 2009). The purpose of this study was to determine if there was a difference in self-directed learning readiness (measured by the SDLRS) between two levels of student learning preferences (i.e., traditional and online learning) in a sample of enrollees in online doctoral programs at the College of Graduate Health Studies at A.T. Still University.

## Method

The design for this exploratory study was quantitative descriptive with a cross-sectional design for review at one point in time for individual learning preferences and SDLRS scores. The population studied was persons currently enrolled as online students in the College of Graduate Health Studies at A.T. Still University. This group encompassed only doctoral students. This college offers three program concentrations structured so the program can be completed in 3 years online with 64 credit hours of online education. Consecutive sampling was used as students were taken as participants as they were available and met the selection criteria (Portney & Watkins, 2009). The sample included the entire accessible population in the specified 4-week time period of the study (Portney & Watkins, 2009). Participants included were those enrolled in one of the three online program concentrations at A.T. Still University; specifically, the Doctor of Health Sciences (DHSc), Doctor of Health Education (DHED), and Doctor of Health Administration (DHA). Participants excluded were students who had not been accepted into one of the three programs, who were not actively taking classes, or who had graduated. The research question to determine if enrollees in online doctoral programs had higher readiness for self-directed learning as measured by the SDLRS was answered with a comparison of scores to the SDLRS mean. Students who are enrolled in the online doctoral programs scored high on the SDLRS.

### Instrumentation

The SDLRS is a 58-item validated, self-report questionnaire that uses Likert-type response scales. Its purpose is to measure attitudes, skills, and characteristics that make up a person's present level of learning readiness. An average adult score is 214 with a standard deviation of 25.59 (Guglielmino, 1978). People who score high have a tendency to do better in occupations that involve high degrees of creativity, change, and problem solving. People with high SDLRS scores prefer to plan, implement, and guide their learning needs. This does not mean that they will not choose a structured learning

environment such as traditional courses and workshops but that they do well in unstructured settings. People with low average SDLRS scores prefer very structured learning environments such as traditional classroom settings (Guglielmino & Guglielmino, n.d.).

According to Delahaye and Choy (2000), the literature supports the SDLRS as both accurate and useful for measuring readiness for self-directed learning. Studies have demonstrated satisfactory to excellent internal consistency levels with coefficient alpha and split-half reliability measures between .67 and .96 (Guglielmino, 1978). Test-retest reliability of SDLRS was established by Finestone (1984) and Wiley (1981) who achieved reliability coefficients of .82 and .79, respectively. Guglielmino (1978) established content validity of the instrument via a modified Delphi technique using a panel of experts and three rounds of surveys. Finestone (1984) found a clear congruence between Guglielmino's original Delphi results and an extensive review of available literature on self-directed learning.

## Data Collection

A pre-survey notice was sent to all potential participants who were persons currently enrolled as online students in one of the three programs in the College of Graduate Health Studies at A.T. Still University. The presurvey was sent via A.T. Still University email. The purpose of the email was to alert potential participants of the upcoming survey and to provide information, requests for voluntary participation, and information as to how confidentiality would be upheld. One week after the presurvey was sent, the survey tool followed. A central function processing program is in place by the SDLRS originator Guglielmino (n.d.). Incoming data were sent directly to the SDLRS processing center and statistician for confidentially; a program collected and analyzed the data. Subject data were organized under ID instead of names to maintain anonymity. Participants were instructed in the survey email how to create a 14-letter ID. Data collection occurred over a 4-week period.

The Institutional Review Board at A.T. Still University approved the survey study. No data collection began until formal approval had been received from the Institutional Review Board. All survey participation was voluntary. The independent taking of the anonymous, online survey implied informed consent.

## Statistical Analysis

The normal data report received from the processing center provided the participant's ID, SDLRS score, sample mean, standard deviation, variance, range, standard error, kurtosis, minimum and maximum score, skewness, number of valid observations, and missing observations. This information allowed for comparison of each individual score to the sample mean and to the adult norms. The following additional demographic information was collected during the time of the survey: gender, age, country, highest level of education completed, doctoral program GPA, self-rated computer level, and occupation.

Raw data were received via an Excel spreadsheet, analyzed via Statistical Package for the Social Sciences (SPSS), and graphically displayed via a combination of Excel and SPSS. A nonparametric test was used followed by the Shapiro-Wilk, visual inspection of the normal Q-Q plots, and box plots for assessment of normality. Histograms show individual score levels. Frequency distributions assisted in identifying group patterns in organizing the data; however, to enable a quantitative summary of the group's characteristics, numbers were gathered through the measures of central tendency. Frequency polygon provided another graphic presentation to enhance understanding of the results. Skewness was assessed as a part of the initial analysis. To determine if there was a difference in SDLRS scores between two levels of preference (i.e., traditional and online learning), a $t$ test was utilized.

## Findings

The target population for this study was doctoral students from A.T. Still University, specifically those enrolled in one of the three online doctoral programs at the University. The actual student population in the doctoral program concentrations at the time of potential sampling was 455. One survey sample was obtained. The potential sample breakdown by program was $n = 259$ enrolled in the DHSc, $n = 174$ in the DHED, and $n = 22$ in the DHA. Participants were not asked to include their specific program concentration as part of the study's demographics to uphold anonymity.

Many of these study participants were middle aged, female, and rated their computer skills as excellent whereas males rated their computer skills as equally good and excellent (see Table 1). In addition, most who participated designated having a master's degree as the highest level of education with males $n = 21$ (35.6%) and females $n = 27$ (45.8%) with the remainder designating post-professional as highest (see Table 1). The majority of participants noted the United States as their nationality except for three who designated Barbados, Bolivia, and Canada.

The raw sample size of this research was 61 participants. After the data were cleaned, one survey was found incomplete resulting in 60 analyzed surveys or a total survey response rate of 13.19%. One survey was completed but yielded no demographics to include age, gender, or nationality. The survey was used and the missing demographics were noted during analysis and representation (see Table 1). Of the participants, 25 did not complete at least one of the extra survey questions regarding educational preference and computer competency (see Table 1).

This study used frequency distributions, specifically the histogram. Frequency distributions assisted in identifying group patterns while organizing the data. To enable a quantitative summary of the group's characteristics, numbers were gathered through the measures of central tendency (Portney & Watkins, 2009). In addition, organization entailed using counts and percentages or ratio level data. Non-normal outcomes were analyzed with tests for significance that did not assume normality. As a rule, the range or median is reported instead of the mean if interval or ratio data are not normally distributed. Surveys that were incomplete were noted but that information was not used in analysis (Portney & Watkins, 2009). The primary analysis technique used to answer

the research question and describe the study participants was descriptive statistics. The α level of .05 was set a priori and utilized for all procedures and statistical testing.

Table 1. *Doctoral Student Characteristics*

|  | Male n (%) | Female n (%) |
|---|---|---|
| **Age By Year** |  |  |
| 25-35 | 6 (10.2) | 14 (23.7) |
| 36-45 | 6 (10.2) | 15 (25.4) |
| 46-55 | 7 (11.9) | 6 (10.2) |
| 56-65 | 2 (3.4) | 3 (5.1) |
| Total | 21 (35.6) | 38 (64.4) |
|  |  |  |
| **Highest Level of Education** |  |  |
| Masters | 21 (35.6) | 27 (45.8) |
| Post-professional | 0 (0.0) | 10 (16.9) |
| PhD, MD, EdD | 0 (0.0) | 1 (1.7) |
| Total | 21 (35.6) | 38 (64.4) |
|  |  |  |
| **Computer Level** |  |  |
| Excellent | 7 (17.9) | 16 (41.0) |
| Good | 6 (15.4) | 9 (23.1) |
| Fair | 0 (0.0) | 1 (2.6) |
| Poor | 0 (0.0) | 0 (0.0) |
| Total | 13 (33.3) | 26 (66.7) |
|  |  |  |
| **Preference for Self-Directed Learning** |  |  |
| Traditional | 3 (8.1) | 9 (24.3) |
| Online | 10 (27.0) | 15 (40.5) |
| Total | 13 (35.1) | 24 (64.9) |
|  |  |  |
| **SDLRS Scores** |  |  |
| Low (58-176) | 0 (0.0) | 0 (0.0) |
| Below Average (177-201) | 0 (0.0) | 3 (5.1) |
| Average (202-226) | 6 (10.2) | 3 (5.1) |
| Above Average (227-251) | 11 (18.3) | 12 (20.3) |
| High (252-290) | 5 (8.5) | 19 (32.2) |
| Total | 22 (37.3) | 37 (62.7) |

*Note.* Though the SDLRS sample reflects $n = 59$ the study sample is actually 60. One of the participants did not designate gender as male or female and therefore could not be grouped in crosstabs that used gender as a column level within the table.

The research question is written in the form of a hypothesis that would be considered non-directional. Causal relationships are not sought; however, thought-provoking relationships are so as to generate a hypothesis (Portney & Watkins, 2009). This study examined relationships between enrollment in online doctoral programs and learning readiness at A.T. Still University using the SDLRS. To answer the research question as to whether students who express a preference for online doctoral programs score higher on the SDLRS compared to those who prefer traditional learning, student scores were first examined according to SDLRS scores (see Figure 1). Overall characteristics were next statistically described for the variables of gender, age, primary occupation, highest level of education, educational preference, and computer competency (nationality was excluded as only three observations were noted as not from the United States). Correlations were then calculated for age, computer competency, gender, and educational preference. Primary occupation and highest education were not correlated as all participants rated themselves as a professional versus a student. Most participants (81.4%) claimed to be at a master's level for highest level of education with the remainder at a post-professional or terminal degree level (see Table 1).
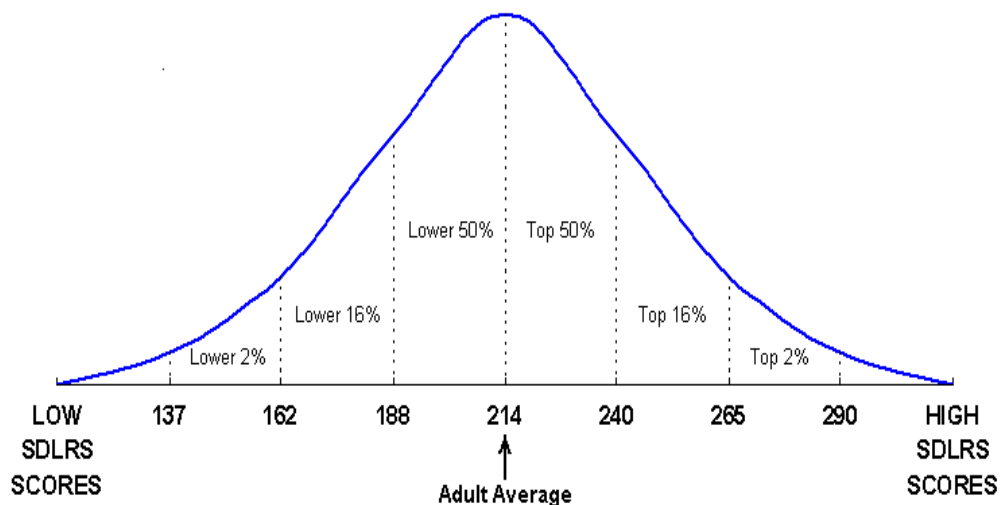


*Figure 1*. Interpretation of the SDLRS scores. Some people have a low level of readiness because they have consistently been exposed to other-directed instruction. Recent research has indicated that country culture may affect scores. The average score for adults completing the SDLRS questionnaire is 214 ($SD = 25.59$; Guglielmino, 1978).

Testing for normality was performed by using a Shapiro-Wilk Original test. Significance values of more than .05 indicated normality. The Q-Q Plot was also performed to assess normal probability plots with straight lines suggesting normal distributions.

In response to the study's main research question (Is there a difference in self-directed learning readiness between those who prefer online learning and those who prefer traditional learning?), the results of the *t* test showed no statistically significant difference in SDLRS scores between the two levels of educational preference ($p = 0.197$).

As shown in Figure 1, the average score of the SDLRS is between 202 and 226, $M = 214$ and $SD = 25.59$ (Guglielmino, 1978). As shown in Figure 2, student SDLRS scores demonstrated left skew as most scored above the average range of 202-226 (Guglielmino, 1978). Females ($n = 38$, $P = 64.4\%$) scored higher overall ($M = 246.58$, $SD = 22.50$) than males ($M = 236.14$, $SD = 21.16$, $n = 21$, $P = 35.6\%$) as shown in Table 1 and Figure 2. An additional *t* test of SDLRS scores between genders also showed no statistically significant difference ($p = 0.087$).

When a difference test between the SDLRS scores of the sample and the population mean ($\mu = 214$) was performed, a statistically significant difference between the sample of online doctoral students and the population was found ($p < 0.0005$); the study sample mean SDLRS score was 243.10 ($SD = 22.30$) as compared to the population SDLRS mean of 214. When the two levels of educational preference (i.e., traditional and online) were analyzed separately, traditional education preference had a mean of 251.67 ($SD = 17.70$) and online education preference had a mean of 242.28 ($SD = 21.42$). One sample *t* tests also showed a statistically significant difference between the population mean and traditional education preference ($p < 0.0005$) and online education preference ($p < 0.0005$) individually.

The relationship between learning readiness as measured by SDLRS score and age, gender, education preference, and computer competency was investigated using a Spearman rho correlation for age and computer competency and point-biserial for gender and educational preference (see Table 2). With age, there was a very weak positive correlation between the two variables though this was not statistically significant. Computer competency also showed a very weak positive correlation with SDLRS scores, but again did not reach statistically significant levels. Preliminary analysis was performed using the Shapiro-Wilk, Q-Q Plot, and Levene's Test for Equality of Variance to ensure no violation of assumptions of normality and homoscedasticity (Portney & Watkins, 2009). The Shapiro-Wilk's test, visual inspection of the normal Q-Q plots, box plots, and histograms showed the scores were approximately normally distributed with the exception of female gender (Table 3).

Table 2. *Correlation of SDLRS Score With Other Variables*

|  |  | Age | Computer Competency | Gender | Educational Preference |
|---|---|---|---|---|---|
| SDLRS Score | Correlation Coefficient | .249 | .212 | .225 | -.217 |
|  | Sig. (two-tailed) | .455 | .196 | .087 | .197 |

This study found the following confidence intervals for males and females: 95% CI for SDLRS scores for males [226.51, 245.77] and females [239.18, 253.97]; however, the CI is questionable for females due to non-normality. Figure 2 shows that females in this sample scored on average 10.44 points higher on the SDLRS than males. Students in the age range of 36-45 had the highest average SDLRS scores ($M = 246.9$; see Figure 3). The data are homoscedastic for gender ($p = 0.939$) and also age ($p = 0.935$).

Table 3. *Normality of SDLRS Scores as Assessed by Shapiro-Wilk's Test*

| | | Skewness | Kurtosis | Sig. |
|---|---|---|---|---|
| Age | 25-35 | -.504 (.512.) | -.500 (.992) | .260 |
| | 36-45 | -.866 (.501) | .641 (.972) | .280 |
| | 46-55 | -.443 (.616) | -.118 (1.191) | .162 |
| | 56-65 | -.093 (.913) | -1.540 (2.000) | .761 |
| Computer Competency | Excellent | .615 (.481) | -.622 (.935) | .472 |
| | Good | -1.022 (.580) | 1.438 (1.121) | .612 |
| Gender | Male | -.243 (.501) | -.923 (.972) | .249 |
| | Female | -2.05 (.383) | .557 (.750) | .028* |
| Educational Preference | Traditional | .618 (.637) | .497 (1.232) | .770 |
| | Online | -1.109 (.464) | -.599 (.902) | .126 |

*Note.* Standard error appears in parentheses below skewness and kurtosis.
Computer Competency for Fair ($n = 1$) and Poor ($n = 0$) were not analyzed.
*$p < .05$.
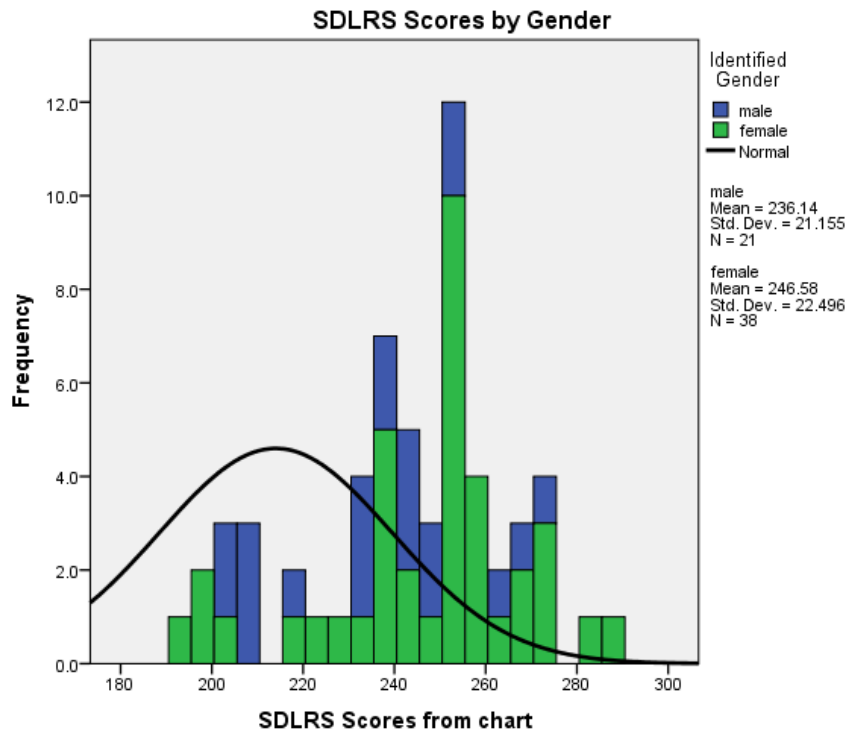
*Figure 2*. The mean overall score for females on SDLRS scores was higher than males (Δ = 10.44). A normal distribution curve with *M* = 214 and *SD* = 25.59 was superimposed on this graph. This distribution curve reflects the mean and standard deviation for all SDLRS tests as documented by the creator of the SDLRS (see Figure 1).
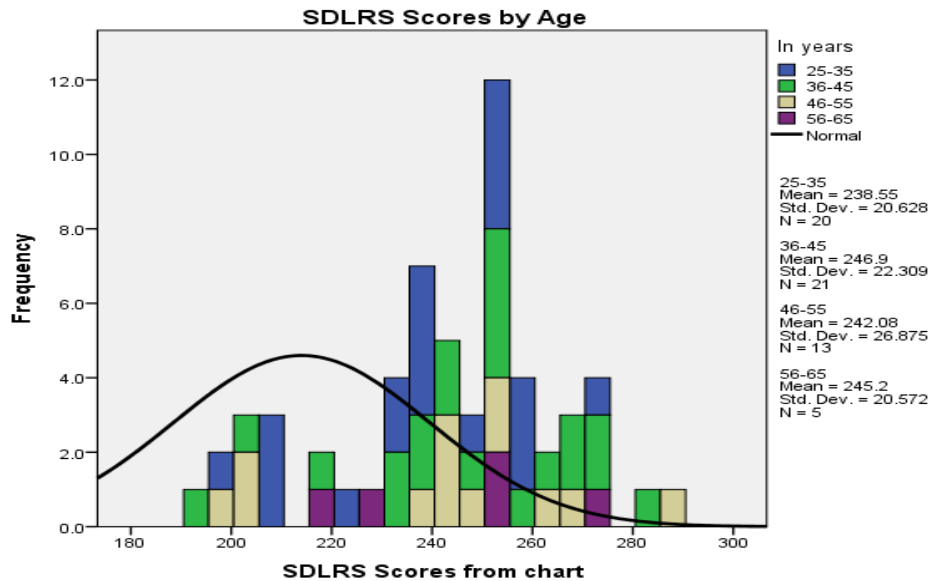
*Figure 3.* SDLRS group scores grouped by age showing the higher scores for the group age of 36-45 years of age, which demonstrate this age group has the highest level for learning readiness for the sample. A normal distribution curve with *M* = 214 and *SD* = 25.59 was superimposed on this graph. This distribution curve reflects the mean and standard deviation for all SDLRS tests.

## Discussion

Technology as a means for learning is growing in popularity due to many variables. Technology has changed higher education as more students enroll in online courses (Pirani, 2013). Teachers and students can now live in different locations and not lose time and energy traveling (Zhuhadar, Yang, & Lytras, 2012). Web-based learning has opened up interaction between groups that was not previously possible (Mense, Crain-Dorough, Stringer, & Richardson, 2013). The findings address the following research question: Is there a difference in self-directed learning readiness between those who prefer traditional learning and those who prefer online learning? No statistically significant difference was found (*p* = 0.197). Learning readiness ought to be considered to inform choice versus preference in regard to mode of instructional approach. Of additional interest is how this study's sample scored higher than the general population on average; though this is suggestive, this result in and of itself cannot be generalized to a population or conclusions drawn for causation, but, if taken together with the finding of no significant difference between self-directed learning readiness between traditional and online preference, several inferences become evident.

As the sample was exclusively online students enrolled in a doctoral level course, the statistical difference between the study sample SDLRS mean score and the SDLRS population mean score could reflect the development of learning readiness

needed to progress to a doctoral level of academics as well as participate in an online program at a doctoral level. This is further supported by the finding of a significant difference between the sample's SDLRS mean scores when separated by educational preference compared to the SDLRS population mean. When viewed together, these findings have several implications.

The lack of significant difference between SDLRS scores based on preference may be a reflection of the study sample's prior academic history, which led to the development of learning readiness to a level independent of educational preference. This could be tested by looking at learning readiness versus education preference in a younger sample (e.g., high school students prior to undergraduate education) that has not statistically deviated from the population mean of self-directed learning readiness.

A second implication is that choice of education, rather than preference, may have a stronger correlation to learning readiness. Although the study's sample was exclusively online students, assessment of prior educational exposure was not done. Future studies could assess differences in self-directed learning readiness between samples of students with primarily traditional (i.e., classroom) versus online (or self-directed) educations.

There was a very weak positive correlation with age with an increase of score levels of the SDLRS associated with age $r(57) = 0.249$, $p = 0.455$. There was a very weak positive correlation with computer competency with an increase of score levels of the SDLRS associated with computer competency $r(57) = 0.212$, $p = 0.196$. The data for age and computer competency did not reach statistically significant levels such that a definite conclusion cannot be made, yet these variables have strong potential for future study. The point of these additional analyses apart from the study's main purpose was to guide future studies in this area of self-directed learning.

Education ought to take into account that different people learn best in varied delivery systems (Thorell, Fridorff-Jens, Lassen, Lange, & Kayser, 2015). Student learning styles cannot be ignored for best education outcomes (Llic, Nordin, Glasziou, Tilson, & Villanueva, 2015). Self-understanding and communication are important. In Ericsson's (2008) description of deliberate practice, "an area of performance that is to be improved is identified, and then immediate and detailed feedback is provided during performance" (p. 988). This demonstrates the importance for communication in learning and the need for students to understand their preference for learning. For change to be possible, students need to understand their preferences and how preference can affect learning (Guglielmino & Guglielmino, n.d.; Lemione & Richardson, 2013).

## Implications

Study results address the question of whether or not students who enroll in online doctoral programs score high on the SDLRS by demonstrating high levels of self-directed learning readiness. In summary, there was not a correlation found between SDLRS scores and either age or computer competency level. None of the tests demonstrated statistically significant levels. In spite of this, educators and students need to be aware of the need to incorporate learning styles and preferences into curriculum and choices.

- Understanding student learning preferences and perceptions enables effective teaching (Kunin et al., 2013).
- Higher education is consumer-driven. For this reason, it is important to understand the needs of the consumer or student. Hancock and Greenwell (2013) explained the need for universities to understand student populations in regard to increasing enrollment and establishing new programs.
- Program selection factors vary across different types of students (Hancock & Greenwell, 2013) and understanding variables for program choice can help restructure programs.

## Limitations

This study has several limitations. Research was limited to one university and three doctoral programs. Although the sample size was adequate, a larger sample size, several universities, and consecutive studies would be warranted for best study outcomes, power, and generalizability. In addition, there was a computer error during the survey data collection process. Only half the students received the survey link; this error was discovered within the first week. The survey and link were immediately resent by the university. This error could have affected the number of participants taking the survey. Also, according to Kunin et al. (2013), learning preference studies are hard to review as there is little agreement as to what learning outcomes ought to be assessed, which can result in uncertainty over which mode of delivery is preferred by students.

## Future Study

According to Lemoine and Richardson (2013), there is a need to study the relationships between technology proficiencies, teaching strategies, emotional processes, and the contextual influences that are involved in learning. A review of the literature reveals that questions have been asked for decades as to how to best blend technology with advancing learning. The need to study the relationship between SDLRS scores and enrollment in an online doctoral degree was evident from the gaps in the literature. Analyzing trends could clarify how people learn best (Sternberg & Grigorenko, 1997). There continues to be a need for research into learning preferences (Williams, 2013).

## Conclusion

The purpose of this study was to determine if there was a difference in self-directed learning readiness (measured by the SDLRS) between two levels of student learning preferences (i.e., traditional and online learning). As technology is a part of society and has become a part of education, understanding learning preferences in students will become increasingly important (Lemoine & Richardson, 2013). A review of literature shows that though some may prefer technology and others may prefer the classroom, communication is vital (Pirani, 2013). Instructors, managers, and university

administrators agree that individual characteristics coupled with shifting demographics and generational characteristics play a central part in learning outcomes (Cambiano, Renee, De Vore, & Snow, 2013; Felder & Silverman, 1988). This factor makes it important to explore both the personal learning styles and choices for delivery of education to the students currently enrolled in higher education. If schools could offer valid learning readiness surveys, it may help students make better choices between distance learning and traditional settings (Sternberg & Grigorenko, 1997). Student understanding for the best mode of learning may assist in student performance and program success (Guglielmino & Guglielmino, n.d.). Even though this study found no difference in SDLRS scores between two levels of educational preference (i.e., traditional and online learning), the finding of significance between the SDLRS general population mean compared to the SDLRS mean for this study's sample (for preference levels separated or aggregated) attests to the development of learning readiness necessary for the rigors inherent to academics at the doctoral level regardless of educational preference.

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# EVALUATING A SELF-DIRECTED LANGUAGE LEARNING COURSE IN A JAPANESE UNIVERSITY

## Neil Curry, Jo Mynard, Junko Noguchi, and Satoko Watkins

This study takes place at a university of international studies in Japan. Incoming freshman students' previous experiences with learning leaves them largely unprepared to direct their own language studies in an autonomous way. The university offers a one-credit elective course that introduces students to self-directed language learning (SDLL) for their English language learning. Taking an interpretative approach to the investigation, the researchers evaluated the course in two ways: (a) with an end-of-course questionnaire with responses from 47 freshman students, and (b) by analyzing documentation of actual work completed by 24 participants (including learning journals, weekly reflections, and an end-of-course report) for evidence of SDLL skills. Results indicate that although learners demonstrate a mastery over the majority of the SDLL skills that were introduced, more support is needed in terms of selecting, using and evaluating resources, strategies, and evaluation of learning gain.

**Keywords:** Self-directed learning, learner autonomy, second language learning, self-access learning, course evaluation

Language educators would generally be in agreement that learners who exercise control over their language learning are likely to achieve success. Autonomous learners will have a good understanding of self-directed language learning (SDLL); that is, cognitive, metacognitive, affective, and social processes that govern learning. They also demonstrate a willingness and ability to apply this knowledge in order to have control over their learning. A general consensus is emerging that consciously helping learners to develop such an awareness and control over SDLL skills leads to greater autonomy and is thus desirable (e.g., Benson 2011; Cotterall & Murray, 2009; Wong & Nunan, 2011). More research is needed in order to understand more about the ways in which learners can best be helped to develop those skills; for example, whether they should be explicitly taught the skills or whether it is better to learn them implicitly when the learner demonstrates an appropriate need for the skills. The context of this study is a university in Japan that specializes in the study of languages and culture. After briefly defining SDLL and its relationship with self-directed learning (SDL) and learner autonomy, we will describe the aims and structure of a SDLL course offered by the self-access center at the university. This is followed by an evaluation of whether the course

affects the ways in which students think about their learning and whether learners develop awareness and control over SDLL as defined by the learning outcomes (see Appendix). Finally, there is a brief discussion of the implications of the findings for the future of the courses at the university.

## Learner Autonomy and SDLL

Although the field of learner autonomy is now well established and the literature steadily expanding, Everhard (2016) correctly noted that definitions are not necessarily consistent, and multiple terms exist that seemingly describe the same concept. For the purposes of this article, we draw upon Benson's (2011) more general definition of learner autonomy as "taking change of one's own learning" (p. 2) with general acceptance in the field that this is desirable. Researching autonomy is problematic, however, as it is difficult to "measure" or even reliably observe what is essentially a "capacity" (Little, 1991, p. 3). Despite the challenge, there have been studies that developed and validated instruments that measure various defining characteristics of autonomy. In particular, some learner autonomy constructs and the relationships among them were explored. Examples of such constructs are desire, resourcefulness, initiative, and persistence (cf. Carr, 1999; Confessore, 1991; Derrick, 2001, Meyer, 2001; Ponton, 1999).  In this article, we do not attempt to research the development of the capacity of such personal characteristics necessary for autonomy but instead investigate the development of some key skills that serve as tools for awareness raising and ultimately for taking control of one's learning. In order to do this, we draw upon the field of SDL.

SDL takes a humanistic approach, stems from earlier work by Knowles (1975) and more recently by Hiemstra (1994, 2013), and is "designed to help adults learn how to make their own decisions in accomplishing personal learning goals" (Hiemstra, 2013, p. 24). SDL incorporates an awareness and control over ways to learn (i.e., cognition and metacognition) and also an awareness and control over the role emotions play in the learning process (i.e., affect and meta-affective control; Oxford, 2011). These are both necessary for becoming a lifelong learner. Self-directed *language* learning (Dickinson, 1987, 1995; Morrison, 2013; Murray, 2004) applies this thinking to language learning and is often connected with self-access language learning. Self-access language learning is the term given for the support offered to learners outside of the language classroom (typically through the provision of resources, advising, and learner development courses) and has existed as a field of academic inquiry since the 1970s. Whereas language learner autonomy can be seen as an overarching capacity (Little, 1991), SDLL can be seen as skills (incorporating awareness and control) that may contribute to a language learner becoming autonomous. One way to approach the research on how learners take charge of their learning is to focus specifically on skills such as the SDLL skills of goal setting, planning, implementing a plan, using appropriate resources and strategies, and evaluating learning.

**Why Develop SDLL Skills in Language Learners?**

Students in Japan and elsewhere are often required to take and pass examinations in order to enter senior high school and university and therefore "are encouraged to concentrate on schoolwork aimed solely at the passing of exams" (Aspinall, 2005, p. 201). Regarding English, these exams contain questions relying on knowledge of vocabulary and translation skills, and "students and teachers cannot be blamed for focusing exclusively on those skills that will be tested and neglecting those that will not" (Aspinall, 2005, p. 208). A lack of training in communicative approaches on the part of school English teachers (Nishino & Watanabe, 2008) in addition to no communicative requirements on entrance exams means that students do not develop sufficient communicative skills in school. However, in the present context, there is now a great emphasis on spoken communication both inside and outside of class, so students have to adjust their approaches to learning accordingly but often do not know where or how to begin. Many of the students at our university have been "conditioned" to learn in a way that is conducive to one particular context: the high school classroom. However, as Wong and Nunan (2011) noted, less successful language learners display a preference for a learning style that is passive and teacher centered. More successful language learners not only develop autonomy but also realize that autonomy comes from using language for communicative purposes, not "as a subject to be studied in the same way as other subjects" (Wong & Nunan, 2011, p. 147).

Therefore, one approach is to promote and foster autonomy by developing both meta-affective and metacognitive strategies (Oxford, 2011). Meta-affective strategies are concerned with understanding and controlling affective states through intentional strategy use. Metacognitive strategies refer to understanding and controlling cognitive strategies (i.e., ways of learning effectively). Cotterall and Murray (2009) suggested developing "perceived linguistic competence" (p. 39) that can be developed through reflection. Sharing thoughts about the learning experience collectively through reflection can enable learners to observe "that a number of stumbling blocks and barriers that get in the way of language learning are the direct consequence of social and cultural norms" (Esch, 1997, p. 173), allowing them to gain the realization that they possess the ability to change the way that they learn. Likewise, Ryan (1997) described the results of increasing independence in Japanese students by raising awareness of available English language resources that can be found outside the classroom, which is still necessary today.

**How to Develop SDLL Skills in Language Learners**

If we are committed to promoting learner autonomy, how should we go about it? Everhard (2016) offered a summary of some of the main ways that include approaches that take place both inside and outside the classroom. Examples are as follows:
- self-access and access to self (Everhard, 2012, 2013, 2016) where there is an emphasis on language advising over teaching;
- learner training and strategy training (Cohen, 1998; Wong & Nunan, 2011; Oxford, 1989);

- portfolio development (Little, 2005); and
- logbooks, journals, and diaries (Burkert, 2013; Dam, 2006, 2009, 2016; Lacey, 2008).

In terms of classroom approaches to promoting autonomy, Dam (1995, 1999, 2016) outlined a model for an autonomous classroom. In this model, she noted the important role that teachers play in negotiation and cooperation in learning. Her classroom sequence includes time allocated for three types of activity within a series of "work cycles" that comprise the following:

1. teacher's time (i.e., preparation for autonomous learning);
2. learners' time (i.e., learners taking charge of their learning); and
3. together time (i.e., whole class activities including evaluating what has been done).

Within "teacher's time" learners need to know the purpose of a course, be introduced to the notion of autonomous learning, and be equipped with various tools that will help them to learn. Another way of looking at this kind of preparation is to provide learners with SDLL skills that they can use in order to manage their learning during "learners' time." In a self-access context, Sheerin (1997) suggested that this kind of preparation should include a needs analysis, goal setting, and establishing a program of work including appropriate materials and strategies.

A similar approach is described by Carson (2012) who used the classroom as the location for promoting learner autonomy. Like Dam, he suggested a preparation stage in which students become used to the expectations of a different kind of classroom and are helped to evaluate their needs and make a learning plan. The students then carry out their plans and keep an online journal so that the teacher can offer support as needed. There is also a review stage in which students share their experiences of their self-directed learning with their classmates.

Kato and Mynard (2015) called the preparation stage "structured awareness raising" (p. 242) that is likely to follow a loose curriculum yet responds to ideas, interests, and experiences of the learners themselves. Figure 1 summarizes the kind of awareness raising that teachers may include in a classroom preparing learners to take responsibility for their learning. The overlapping areas contributing to the development of autonomous language learning are as follows:

1. awareness of facilities, roles, and resources;
2. awareness of self; and
3. awareness of approaches to language learning.

These areas are supported by a learning advisor (LA) or a teacher adopting an advisor-type role if possible. An LA takes a generally nondirective role in guiding learners to gradually develop a deep awareness of their own language learning

processes through engaging in reflective dialogue (Carson & Mynard, 2012; Kato & Mynard, 2015).
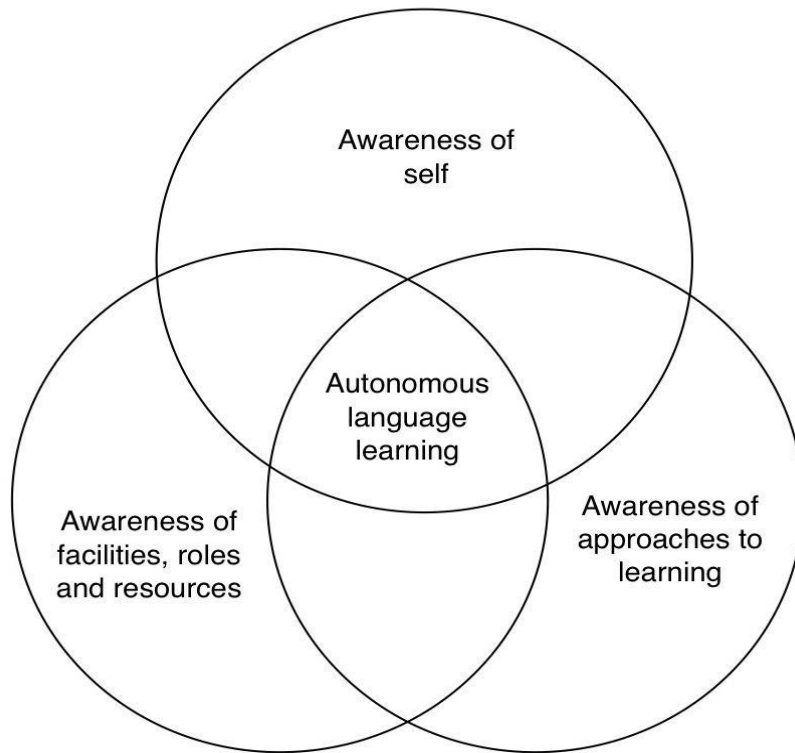


*Figure 1.* Structured awareness raising (Kato & Mynard, 2015, p. 243).

This kind of preparation for self-directed action is not restricted to language learning. Parks-Stamm and Gollwitzer (2009) outlined four phases for achieving a desired outcome and discussed the importance of a strong goal intention, preparation, and evaluation. Achieving goals is closely linked to an awareness of our behaviors for carrying out a plan and achieving those goals. The outcome of such an intentional approach eventually leads to automaticity and behavior change.

Certain skills and tools can be explicitly introduced to learners in order to help them understand and regulate motivational or affective aspects of their learning in order to be effective language learners (e.g., Mynard & McLoughlin, 2014; Valdivia, McLoughlin, & Mynard, 2011; Yamashita, 2015). Examples of tools might be reflective journals, portfolios, and confidence diaries.

## Method

### Context

The research takes place in the self-access learning center (SALC) at a university of international studies in Japan. The SALC is a prominent feature of the university, and its aim is to promote language learner autonomy and English language use. Ten full-time LAs work in the SALC to support students in various ways. LAs have an MA in TESOL or applied linguistics and are professionally trained to advise students on their autonomous language learning. The SALC provides materials, learning spaces, advising services, a curriculum for promoting self-directed learning skills, and access to a community of language users. SALC use is optional, but it receives an average of 600 visitors per day. Research shows that in order for learners to utilize a self-access center efficiently, they need to be supported in the necessary SDLL skills needed to manage their own learning (Benson, 2011; Sheerin, 1997; Takahashi et al., 2013). For this reason, the SALC has a curriculum that aims to promote SDLL. The SALC curriculum is delivered in various forms, but for the purposes of this article, the focus will be on the optional one-credit Effective Language Learning Course (ELLC).

### The SALC Curriculum

The ELLC has been offered since 2010 and is a classroom-based course taught by LAs that also includes self-directed work. In addition to being introduced systematically to self-directed learning strategies, students also receive support as they develop and implement their own plans from LAs and peers. The ELLC has received consistently positive evaluations from students. In addition, previous research conducted on the course (Morrison, 2013) demonstrated that learners improved their ability to implement a plan for self-directed study as a result of taking the course.

The ELLC content draws on the literature in the areas of learner autonomy, self-regulated learning, and self-directed learning and is based on students' needs. In 2012 the SALC team undertook a 2-year evaluation of the curriculum resulting in the development of an updated set of learning outcomes. The curriculum research included input from the major stakeholders (i.e., students, teachers, LAs, and heads of programs; see Thornton, 2013, and Takahashi et al., 2013, for details). Based on this research, the curriculum content relates to the learning outcomes and are as follows (see Appendix and Takahashi et al., 2013, for more details of the learning outcomes):

1. knowing about support and learning opportunities outside class;
2. setting and reviewing goals;
3. selecting, using, and evaluating resources;
4. identifying, using, and evaluating strategies;
5. making, implementing, and evaluating a learning plan; and
6. evaluating linguistic and learning gains.

An outline of the 15-week course is presented in Table 1.

Table 1. *Outline of the Course*

| Week | In Class | Outside Class |
|---|---|---|
| 1 | About the course, self-evaluation | Write self-introductions |
| 2 | Goal setting activities / discussion with peers | Finish activities, write reflections |
| 3 | Strategies and resources activities / discussion with peers | Try a new resource, write reflections |
| 4 | More strategies and resources / discussion with peers | Try new strategies, write reflections |
| 5 | Evaluating learning / discussion with peers | Finish activities, write reflections |
| 6 | Making a learning plan / discussion with peers | Finish making the learning plan |
| 7 | Try out a learning plan / no class / individual advising sessions | Implement the learning plan / meet learning advisor / write reflections |
| 8 | Evaluate learning plan / re-write / implement | Implement learning plan / write reflections |
| 9 | Implement learning plan / discussion with peers | Implement learning plan / write reflections |
| 10 | Implement learning plan / discussion with peers | Implement learning plan / write reflections |
| 11 | Implement learning plan / discussion with peers | Implement learning plan / write reflections |
| 12 | Implement learning plan / discussion with peers | Implement learning plan / write reflections |
| 13 | No class / individual advising sessions Implement your learning plan | Implement learning plan / meet with learning advisor / write reflections |
| 14 | Implement learning plan / discussion with peers | Implement learning plan / write reflections |
| 15 | Final evaluation of learning and the course | Write final reflective report |

**Purpose**

A growing number of students (around 80 currently) take the ELLC every semester, and ongoing informal observations, end of semester surveys, and reflective diaries indicate that the courses are beneficial for the students. However, this has not been sufficiently researched. The purpose of this study is to investigate whether students acquire the

SDLL skills that are being introduced in the course. The research therefore serves as an evaluation of the effectiveness of the course and aims to identify any areas that need to be improved. There is one research question: After completing the ELLC, are students able to meet the course learning outcomes?

**Participants**

The participants were all first-year students in their first semester at the university taking the ELLC for the first time. We (i.e., all four authors) were among the eight teachers team teaching ELLC classes at the time of data collection. As the responses were anonymized, we did not know exactly which participants' responses had been included in the study. However, almost all of the first-year students enrolled in the course were aged 18 or 19 and around half of them were majoring in languages other than English. The English language proficiency levels varied from low intermediate to high intermediate. All the learners had studied English at school for approximately 6 years. The students were asked for their consent to use their data and participate in the study on the final day of the course once all of the coursework had been submitted.

**Design**

The purpose of the research is to describe and comment on whether there is evidence suggesting that the ELLC is promoting an understanding and use of SDLL skills (as defined by the learning outcomes). Due to the nature of the research, an interpretative approach was chosen drawing upon qualitative research methods supported by some descriptive statistics. We were not attempting to *measure* the learning progress or compare results with students who had not taken the course as, although this would be useful, it is very difficult to isolate the factors involved in the complex nature of how one manages one's self-directed learning. Instead, the in-depth qualitative analysis will highlight areas that might need attention in future courses.

**Student Survey**

A survey was administered in Japanese at the end of the first semester in July 2015 to all the students who took the ELLC using the online survey website SurveyMonkey. The majority of students taking the course at the time were freshman students, and we decided to analyze just this group for the present project. Sixty-one students voluntarily completed the survey and agreed to let us include their responses in the research; 47 of the respondents were freshman students. Although the survey included several questions related to the course and the instructors, two questions were specifically developed to shed light on whether the courses successfully introduced learners to SDLL skills. In one question, students were asked, "Did the course influence the way you think about learning?" Student responses to this question were collected via a 6-point Likert scale ranging from *Not at all* to *Yes. Definitely* (see Table 2 for all response options). A follow-up open-ended question asked for reasons. Another question provided 13 statements related to the learning outcomes, and respondents were asked to

choose a statement on a 6-point Likert scale that best described how true the statement was for them ranging from *Definitely not true* to *Very true* (see Table 5 for all response options).

Although previous research (e.g., Takahashi et al., 2013) and our extensive experience working with first-year Japanese university students led to the assumption that the students were not familiar with the SDLL skills prior to taking the course, the following question was added in order to check this assumption: "In the above items, if there is something you were able to do before starting this course/module, please write the item number here. (Example 3, 4, 7)."

## Analysis of Participants' Documentation

The survey elicited students' perceptions of what they felt they had learned from the course, but we also wanted to analyze their *actual* work in order to see whether there was evidence of understanding and use of the SDLL skills that the students had been introduced to.

The document analysis consisted of evaluation of the work of 24 participants. Twenty-nine freshman survey respondents had agreed to let their work be analyzed for the research; however, in five cases, the collated documentation was incomplete so those five participants' work was not included in the analysis.

The students' learning plans, reflective diaries, and final reports for the 5-week implementation period were photocopied and evaluated using a rubric that was based on the course learning outcomes for first-year students. The rubric was designed specifically for the purposes of evaluating evidence of learning outcomes in a SALC module or course based on analysis of documentation. The rubric included the following scale: *Approaches the standard* (A), *Meets the standard* (M), and *Exceeds the standard* (E). The modules and courses were designed for first-year students to achieve an M rating that is summarized in each of the descriptors. Each student's work was evaluated by two experienced learning advisors (two of the authors). The instrument had been piloted with similar data and adjusted in order for it to be straightforward to use. The two evaluators agreed on the criteria for A, M, and E on some sample documents before completing the analysis. Each evaluator rated two or three packets alone and then the two evaluators would compare their evaluations and reach agreement. Where agreement could not be reached, the evaluators used the lower of the two evaluations.

## Findings

### Student Survey

**Influencing thinking about learning.** Students were asked to comment on an open response question about whether the course influenced their thinking and the findings (see Table 2) were positive with all of the respondents indicating that the course did influence their thinking. Almost half of the participants responded *Yes. Definitely*.

Table 2. *Responses to "Did the Course Influence the Way You Think About Learning?"*

|  | Response Percent | Response Count |
|---|---|---|
| Not at all | 0.0% | 0 |
| Hardly at all | 0.0% | 0 |
| Not very much | 0.0% | 0 |
| Yes, somewhat | 19.1% | 9 |
| Yes | 36.2% | 17 |
| Yes. Definitely | 44.7% | 21 |

The follow-up question asked participants for reasons for their answers. A content analysis of the responses to the open-ended follow-up question was completed by one of the authors, and the results highlight the large variety of ways in which the learners believed their ways of thinking about learning had changed. Some respondents mentioned more than one reason. The responses were grouped into main content areas as can be seen in Table 3. It is clear that the majority of the participants felt that Learning How to Learn influenced the way they think about learning, and this has been further subcategorized in Table 4.

Table 3. *Responses to "Please Give Reasons [Why the Course Influenced the Way You Think About Learning?]"*

| Category | Description of Items in the Category | Response Count |
|---|---|---|
| Learning how to learn | They learned how to learn. | 26 |
| Motivation | Their motivation increased. | 6 |
| Improvement | Their English skills have improved. | 5 |
| LA | Their LA's comments were helpful. | 3 |
| Time management | They learned how to manage their time effectively. | 3 |
| Awareness | They started to pay more attention to their English skills. | 2 |
| Others | None of the above | 8 |

Table 4. *Subcategory of Responses for Learning How to Learn*

| 'Learning How to Learn' Subcategories | Response Count |
|---|---|
| Finding ways to learn that suit me | 6 |
| Finding effective ways to learn | 5 |
| Finding new ways to learn | 4 |
| Freedom to choose and try different ways to learn | 3 |
| Identifying strength and weakness | 2 |
| Learning how to plan my own learning | 2 |
| Learning importance of self-directed learning skills | 2 |
| Establishing self-study habits | 1 |
| learning how to manage my motivation | 1 |

Furthermore, looking at Table 4 that shows the subcategories of Learning How to Learn, all the top four of the subcategories (i.e. "Finding ways to learn that suit me," "Finding effective ways to learn," "Finding new ways to learn," and "Freedom to choose and try different ways to learn") seem to imply that students enjoyed the freedom of exploring and experimenting with various and sometimes new ways to learn in order to find those that are suitable for them. It seems that this experiential process of exploration and discovery influenced the way they think about learning. The results also indicate some students think that learning some practical skills such as diagnostic skills, planning skills, routinization skills, and affective management skills had an impact on their perception of learning.

**Learning outcomes.** The analysis of the question on the student survey related to learning outcomes largely indicated that students felt that they had developed SDLL skills (see Table 5). The results show that in the majority of cases, participants felt that they had met the learning outcomes. Three participants responded to the question "In the above items, if there is something you were able to do before starting this course, please write the item number here. (Example 3, 4, 7)" by identifying three different items:

- item 1 (I know how to identify my language strengths and weaknesses);
- item 3 (I know how to draw upon previous knowledge and experiences in order to individualize my plan); and
- item 12 (I know how to evaluate my linguistic gains).

The limited responses to this question confirmed the assumption that learners were largely unfamiliar with SDLL skills prior to taking the course.

Table 5. *Responses to Statements About the Learning Outcomes [Which Statements are True About You?]*

| | Definitely not true (1) | Mostly not true (2) | Not especially true (3) | Somewhat true (4) | True (5) | Very true (6) | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| 1. I know how to identify my language strengths and weaknesses | 0 | 0 | 1 | 11 | 20 | 15 | 5.04 | 47 |
| 2. I know how to set a relevant and realistic goals considering my wants, interests and needs | 0 | 0 | 0 | 8 | 21 | 18 | 5.21 | 47 |
| 3. I know how to draw upon previous knowledge and experiences in order to individualise my plan | 0 | 0 | 0 | 11 | 19 | 17 | 5.13 | 47 |
| 4. I know how to locate resources that will help me to address my goals | 0 | 0 | 3 | 12 | 16 | 16 | 4.96 | 47 |
| 5. I know how to get information about additional learning strategies when I need them | 0 | 0 | 0 | 16 | 21 | 10 | 4.87 | 47 |
| 6. I understand the difference between S,U and R (Study, Use and Review) activities | 0 | 0 | 0 | 11 | 10 | 26 | 5.32 | 47 |
| 7. I know how to make a basic learning plan which forms a practical guide for a period of self-directed study | 0 | 0 | 1 | 4 | 23 | 19 | 5.28 | 47 |
| 8. I could implement a basic learning plan for a minimum period of self-study (3 weeks). | 1 | 3 | 2 | 12 | 14 | 15 | 4.7 | 47 |
| 9. I tried at least two new learning strategies and reflect on their effectiveness and suitability for my goals | 0 | 1 | 1 | 17 | 20 | 8 | 4.7 | 47 |
| 10. I know how to evaluate the effectiveness of a learning plan | 0 | 1 | 3 | 12 | 21 | 10 | 4.77 | 47 |
| 11. I could evaluate the effectiveness of my plan | 0 | 1 | 3 | 11 | 23 | 9 | 4.77 | 47 |
| 12. I know how to evaluate my linguistic gains | 0 | 0 | 3 | 14 | 19 | 11 | 4.81 | 47 |
| 13. I was able to evaluate whether or not there have been linguistic gains | 0 | 1 | 4 | 12 | 17 | 13 | 4.79 | 47 |

**Analysis of Documentation**

Documentation of 5 weeks of reflective journaling and documentation was analyzed for 24 participants (see Table 6). The main findings of the document analysis indicated that students were largely demonstrating evidence of meeting the learning outcomes of the course. In addition, areas that will need more attention were highlighted

Table 6. *Results of the Document Analysis Investigating Whether Participants Achieved the Learning Outcomes*

| | Approaches the Standard | Meets the Standard | Exceeds the Standard |
|---|---|---|---|
| **Setting and Reviewing Goals** The student can set a relevant and realistic goal | 3 (13%) | 17 (70%) | 4 (17%) |
| **Selecting, Using and Evaluating Resources** The student tried at least one resource and reflected on its suitability for his/her goals | 6 (25%) | 10 (42%) | 8 (33%) |
| **Identifying, Using and Evaluating Strategies** The student tried a new strategy and reflected on its effectiveness / suitability for his/her goals | 7 (29%) | 10 (42%) | 7 (29%) |
| **Making, Implementing and Evaluating a Learning Plan** | | | |
| - The student demonstrated that she/he understands the difference between S,U and R (Study, Use and Review) activities. | 4 (17%) | 12 (50%) | 8 (33%) |
| - The student can make a basic learning plan which forms a practical guide for a period of self-directed study. | 2 (8%) | 12 (50%) | 10 (42%) |
| - The student implements the learning plan for a minimum period of self study (3 weeks). | 0 | 18 (75%) | 6 (25%) |
| - The student evaluates the effectiveness of the implementation phase. | 5 (21%) | 7 (29%) | 12 (50%) |
| **Evaluating Linguistic Gains** | | | |
| The student demonstrates how to evaluate linguistic gains | 11 (46%) | 13 (54%) | 0 |
| The student can evaluate whether or not there have been linguistic gains | 10 (42%) | 12 (50%) | 2 (8%) |

Findings indicated that 70% of participants met the standard for setting goals. The students were also largely successful in terms of creating an initial learning plan to serve as a guide and also in determining the scope of their weekly activities.

In terms of choice, use, and evaluation of resources and strategies, the results showed 25-29% of students merely approached yet did not meeting the standard. This finding indicates that perhaps it will be necessary to reconsider how students are instructed in the evaluation of resources and strategies for learning in the future.

The main area of concern involves the evaluation of linguistic gains. Here only slightly more than half of the students were able to show that they had met the outcomes, and in fact many of the students' accounts made no mention of any evaluative processes. However, this result is not surprising as the concept of self-evaluation of the learning process is typically a difficult one for students to grasp as they have little experience with it.

## Limitations

There are three main limitations. Firstly, interviews could have been conducted with participants in order to achieve a greater understanding of the development of SDLL. However, for logistical reasons this was not possible for the present study but will certainly be included in future studies.

In addition, other possible contributing variables were not considered in the research. In order to ensure honest and sufficient responses to the questionnaires, questions were kept to a minimum and responses were anonymous. In addition, the documents being analyzed were also kept anonymous. As a result, we were unable to make any observations about language proficiency, language major, teacher variation, or any other variables that could further aid our understanding of factors influencing learning.

Finally, it would have been useful to compare these results with participants who had not taken the ELLC course to see if there was any variation. In that case, a larger sample size would have been needed. A study of this nature is planned for the future.

## Discussion

The findings indicate that the course is generally meeting its outcomes and that students appear to develop a mastery of SDLL skills during the 15 weeks as evidenced by the survey and the document analysis. However, some SDLL skills still appear to need further development, which will be discussed.

### Resources and Strategies

Whereas the majority of participants demonstrated that they had either met or exceeded the standard with regards to selecting, using, and evaluating resources and strategies, a relatively high number of students struggled with this aspect of SDLL. Six participants (25%) were unable to demonstrate the required control over resources and 7 participants

(29%) did not demonstrate control over strategy selection, use, and evaluation. This information was shared with the LAs teaching the course. All of the LAs indicated surprise as 2 weeks are dedicated to introducing students to resources and strategies, and students appear to demonstrate an awareness during that time. The systematic document analysis was useful in highlighting that this is an area for the LAs to be aware of and to further support during the implementation phase.

**Evaluating Linguistic Gains**

One key area of being an autonomous learner is to be able to know when learning has occurred. Being able to evaluate one's own linguistic gains ensures success in lifelong learning beyond graduating from university. Although the LAs explicitly demonstrate how learning can be evaluated and provided activities and support in using diagnostic tests during the classes and advising sessions, it has always been a difficult concept for first-year learners to grasp. The document analysis supported our assumptions that this higher-order capacity is unlikely to be a realistic learning outcome for first-year students. After a discussion with the other LAs, it was agreed that this aspect of the course would remain; however, it is expected that this capacity will develop in the second ELLC course once the learner has had the chance to undertake several learning cycles.

### Conclusions

The research demonstrates that SDLL skills can be taught to freshman university students in Japan. The participants indicated that the course influenced the ways in which they thought about their learning. This is crucial for helping learners who are making the transition from high school to university and from being a passive language learner to a more active language user and lifelong learner. However, we must acknowledge that having students participate in one relatively short elective course focusing on SDLL has limitations. We suggest that SDLL skills be integrated into mainstream university language classrooms in a more systematic way. However, there are benefits for also having ELLC as a stand-alone course. For example, the instructors for the ELLC courses are experts in the promotion of learner autonomy and can ensure that SDLL skills are adequately introduced. In mainstream language classrooms, the introduction of SDLL skills is often minimal for various reasons such as teacher beliefs about learning or priority given to other curriculum content particularly if it is assessed. More research is needed in order to make a more convincing case that SDLL not only *can* be taught but also *should* be taught in first-year Japanese universities in order to prepare students for autonomous lifelong learning.

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**Appendix**

**Learning Outcomes for SALC Modules and Courses**

**1. Knowing about support/opportunities outside of class**
- Freshman students should know what opportunities exist outside of class to support them (Advising, SALC, Practice Centre, Writing Centre, ELI Lounge, Language exchange, Study Buddy, elisalc.org website)
- Freshman students should know how to get a SALC card and how to participate in SALC events
- Students should know the purpose of the advising service
- Freshman students should know how to access SALC services and facilities
- Students should know how to access online resources for self-directed learning

**2. Setting and reviewing goals**
- Freshman students should be able to identify their language strengths and weaknesses
- Freshman students should know how to set relevant and realistic goals considering their wants, interests, and needs
- Freshman students should know a metalanguage for talking about their learning
- Students should draw upon previous knowledge and experiences in order to individualize their plans

**3. Selecting, using, and evaluating resources**
- Students should be able to locate resources that will help them to address their goals
- Students should try at least two new resources and reflect on their suitability for their goals

**4. Identifying, using, and evaluating strategies**
- Students should try at least two new strategies and reflect on their effectiveness and suitability for their goals
- Students should know how to get information about learning additional strategies when they need them

**5. Making, implementing, and evaluating a learning plan**
- Students should demonstrate that they understand the difference between S, U, and R (Study, Use, and Review) activities
- Students should be able to make a basic learning plan that forms a practical guide for a period of self-directed study
- Students should implement a basic learning plan for a minimum period of self

study (3 weeks).

## 6. Evaluating linguistic and learning gains
- Students should evaluate the effectiveness of the implementation phase
- Students should demonstrate how to evaluate linguistic gains

Students should be able to evaluate whether or not there have been linguistic gains

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# SELF-DIRECTION IN ONLINE LEARNING: THE STUDENT EXPERIENCE

## Rachel C. Plews

The purpose of this research was to explore self-directed learning (SDL) in the context of online learning. The experiences of traditional and nontraditional learners engaged in an online course as part of a degree-seeking program are explored in terms of readiness for SDL and the processes of planning, monitoring, and evaluating one's own learning in the online context. The findings present small nuances in how different learners describe SDL in the online context related to how the different students perceive their learning in an online course. Traditional learners discuss the impact of the flexible nature of online learning as it relates to the process of SDL while nontraditional learners focus more on the learning process itself. Areas for future study in the area of SDL in online learning are shared to highlight the importance of exploring adult learning theory in the online context from both learner and educator perspectives.

**Keywords:** self-directed learning, online learning, readiness for online learning

The terminology surrounding online learning is complex with terms such as distance education, virtual learning, and e-learning often being used interchangeably (Online Learning, 2015). Although these terms often have variations in form and delivery, the common element is instructional delivery with technology. The context of instructional delivery with technology has added another level of complexity to how educators understand and apply adult learning theories to practice. The purpose of this study was to explore self-directed learning (SDL) in the online learning context. It describes the experiences of both traditional and nontraditional undergraduate students engaged in an online course, beginning with learner attributes related to readiness and preparedness for SDL and then moving to an exploration of how the SDL process is described in the online context. This view is necessary as the nature of the learner as well as the context of the learning environment change, evolve, and expand.

Allen and Seaman (2013) stated that in 2011, approximately 6.7 million students were enrolled in online courses, an increase of 570,000 students from the prior year. This was a vast increase from 2002 when 1.6 million students were enrolled in at least one online course. According to Parker, Lenhart, and Moore (2011), about 25% of college students reported having taken a class online; this number almost doubles to 46% when looking at college graduates in the last 10 years. Parker et al. (2011) also

examined how college presidents viewed the future of online education. Specifically, college presidents predicted the highest growth would come from community colleges where, in the next 10 years, approximately 65% of students will have taken an online course compared to 16% at the time of the report, and with overall approximately 77% of higher education institutions offering some type of online courses (Parker et al., 2011).

Song and Hill (2007) developed a conceptual framework for understanding SDL in the online context based on Candy's (1991) viewpoint that context affects a learner's ability to be self-directed. An implication of their work was to explore how adult learners take control of their learning in the online environment and the unique opportunities and challenges of this context. A second implication of their study was to examine the different approaches that individuals with different levels of self-direction take in an online environment. Overall, Song and Hill's work framed the significance and the relevance of exploring SDL in the online context particularly as the demand and enrollment for online learning courses and programs has increased over the years.

As this study explores SDL in the online context from the experiences of traditional and nontraditional learners, it is important to define these types of learners. Historically in the context of higher education, *traditional learners* are individuals who begin college right after high school and attend full-time, and those who are ready academically to attend classes (Deil-Amen, 2011). On the other hand, *nontraditional learners* are characterized by more complex life situations that can interfere with educational objectives that include family and work responsibilities. The National Center for Education Statistics (NCES) in the U.S. further delineates these situations to include delayed enrollment after high school, studying part-time, working full-time while studying, financially independent, having dependents, or not having a traditional high school diploma (Horn & Carroll, 1996). In addition to these characteristics, age is another factor in defining the difference between these categories of learners, with the nontraditional learner as an individual 24 years or older (Snyder & Dillow, 2012).

This article presents a review of the literature on online learning, self-directed learning, and more specifically SDL in the online context. The purpose of the research and the main research question is then outlined, followed by the method of the study. Next, the findings are shared related to readiness for SDL and the SDL process in the online context. Discussion and implications for future research in the area of SDL in the online context conclude the paper.

## Literature Review

### Online Learning

*Online learning* is defined as "instruction that is delivered electronically using computer based media, including websites, the Internet, Intranet, CD, and DVD" (Smaldino, Lowther, & Russell, 2008, p. 181). Karakas and Manisaligil (2012) expanded this definition to include more recent and emerging virtual technologies such as digital tools, Web 2.0 technologies, social networking, and social media. In addition to these technologies, Ellis (2004) argued that e-learning also includes audio and video

tape, satellite broadcast, and interactive television. These technologies are not only changing how people learn but also continuing to change and advance virtually all aspects of modern life, including the way people produce, consume, communicate, and think (Collins & Halverson, 2009).

Online learning, virtual learning environments, and e-learning—terms that are often used interchangeably—evolved from and are often described as a form of distance learning. Moore, Dickson-Deane, and Galyen (2011) identified the main characteristic of distance learning as a learning environment for those who are geographically dispersed. In order to reach a more diverse and geographically dispersed population of learners particularly in higher education, many distance education programs formed with the distinguishing characteristic of the instructional team being separated from the learner during the learning (Smaldino et al., 2008).

Online learning is an interactive environment that promotes the constructivist principle of learning focused on understanding and meaning making (Conrad, 2005; Lee, 2009). It is about knowledge construction rather than knowledge instruction. Tavangarian, Leypold, Nölting, Röser, and Voigt (2004) contributed to describing e-learning as constructivist due to the knowledge construction process that occurs wherein the learner's experience is transformed into knowledge. In this type of environment, the instructor's role transitions to a learning facilitator as compared with the instructor's traditional didactic role. This facilitator role guides students as they move along in their learning, and the learner takes an active role as compared with being a passive receptacle for knowledge (Smaldino et al., 2008). Berge, Collins, and Bruce-Hayter (1995) also looked at online learning from the constructivist paradigm in which learners assume more control of their own learning. More specifically, online learning was described as learning that promotes the constructivist principles of having learners think critically, solve problems, accommodate different perspectives, and engage in authentic learning activities.

The defining asynchronous characteristic of online learning permits the "anytime, anywhere" learning experience where different learners experience the same content at different times. Although not all online learning formats are asynchronous, this format defines and promotes some key benefits for this type of learning. The anytime, anywhere format of online learning supports just-in-time learning in which the focus is on having learners develop the skills to find the right information anywhere, not just in classrooms with educators (Collins & Halverson, 2009). Convenience and flexibility are two core benefits of online learning (Song & Hill, 2007). These benefits outweigh some of the issues that both learners and educators can encounter such as technical issues, delayed communication, and different levels of community among learners.

**Readiness for Online Learning**

Readiness for online learning is linked to many elements of learner self-direction as defined by Knowles (1975) that includes personal goal setting, problem solving, learning strategies, motivation, and autonomy (Bernard, Brauer, Abrami, & Surkes, 2004; McVay, 2000; Smith, 2001; Warner, Christie, & Choy, 1998). The different

instruments available to assess readiness for online learning have shifted from a focus solely on learner characteristics and preferences (Warner et al., 1998) to instruments that also emphasized technology capabilities (Bernard et al., 2004). Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, and Marczynski (2011) adapted the work of earlier researchers to test the validity of previously created instruments and to condense and combine the instruments with their own work because technologies have advanced and research in the area has continued. Assessing readiness for online learning can provide insight into online learners' characteristics as well as their prior experience with all learning formats and with technology.

**Persistence in Online Learning**

While looking at factors that can increase student success in the online environment, various research studies also looked at why students do not persist in different learning environments. A 2009 study by Park and Choi examined predictors of organizational support and relevance when looking at learner persistence in the online context. Park (2007) presented a theoretical framework for adult dropout in online learning, originating out of Tinto's (1993) student integration model and Bean and Metzner's (1985) student attrition model, two models that looked to explain a learner's decision to drop out of a course. Both models were based on the traditional face-to-face learning environment for traditional and nontraditional learners. Park (2007) integrated the two models to look at learner persistence prior to and after the start of an online course.

Rovai (2003) expanded these earlier frameworks (Bean & Metzner, 1985; Tinto, 1993) to include a learner's decision to drop out of an online course. The model includes student characteristics and student skills prior to admission (i.e., preadmission characteristics) and internal and external postadmission factors that includes finances, outside employment, study habits, and absenteeism. Park (2007) presented the viewpoint that the internal and external factors influencing a learner to drop out or persist are intercorrelated. Park's framework explored how learner characteristics and skills prior to course enrollment can be influenced by the internal and external issues a learner faces while moving through the online course and that would ultimately result in dropout or persistence.

Park and Choi (2009) looked to identify meaningful factors affecting a student's decision to drop out, which led to identification of strategies for student retention in online learning. They examined factors including the individual characteristics of age, gender, educational background, and employment background, mainly prior to the course beginning. External factors included family and organizational support, and internal factors included motivation and academic and social integration. They conducted the research study over a 2-year period with 147 adult learners who took one of three online courses over the same period. From this sample, about 67% persisted in completing the course, and 33% did not complete the course. The participants completed a qualitative survey that looked at the various issues listed above relating to persistence and dropout with the intent to examine differences between the two classifications of learners.

Like previous studies regarding the individual characteristics of online learners, the Park and Choi (2009) study identified differences in the learners' individual

characteristics and did not find evidence that particular characteristics influenced learner decisions to drop out or persist. The study looked closely at the external factors the learner might face during the online course and found these factors—particularly family and organizational support from the learner's workplace—to be significant. Further, the study found that these factors did not necessarily indicate learner characteristics because many external factors are out of the learner's control. In order to decrease the dropout rate, instructional designers should consider external factors when designing online courses. Learner satisfaction and relevance to the learner's life, whether at home or in the workplace, were both found to be significant. Learners who described themselves overall as satisfied with the course were more likely to be the learners who persisted regardless of other factors.

## Self-Directed Learning

Scholars have explored SDL from different perspectives that include two main ones: process and personal attribute. SDL theory emerged from Tough's (1971) work and definition of self-directed learning as self-planned learning with a highly deliberate effort to learn from the things that take place around the learner. Knowles (1975) expanded this definition to include more specific aspects of the SDL process; that is, he defined SDL as a process "in which individuals take the initiative with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). Some synonymous terms for SDL, including *autonomous learning*, *self-study*, and *self-planned learning*, all point toward independent learning, but SDL does not necessarily occur in isolation (Leach, 2000).

The SDL learning theory has moved from linear models focusing on the process of organizing instruction and goals to interactive and instructional models incorporating the learner, educator or facilitator, and other factors. The earlier models of Knowles (1975) and Tough (1971) were linear in nature and provided step-by-step processes for learners to become more self-directed in the learning process. They assumed that as learners mature, they become more self-directed. Nonlinear, interactive models (Brockett & Hiemstra, 1991; Garrison, 1997; Spear, 1988) incorporated various factors into SDL, including opportunities; prior, current, and future experiences; individual personality characteristics; context; cognition; and motivation. Candy (1991) was one of the primary scholars who acknowledged that learners may exhibit different levels of SDL in different environments or contexts. For example, learners familiar with a topic or with prior experience in an area might exhibit more self-directedness in the new learning situation. Even though Candy acknowledged context, there was no direct link to the online environment or online classroom.

Three major instruments that assess learner readiness for SDL include the Self-Directed Learning Readiness Scale (SDLRS), the Oddi Continuing Learning Inventory (OCLI), and the SDL Perception Scale. In 1977, Guglielmino developed the SDLRS, also known as the Learning Preference Assessment (LPA), to assess the ability and cognitive readiness of adults to engage in SDL. The indicators for this scale are based

on characteristics such as initiative, independence, persistence in learning, acceptance of responsibility for one's own learning, strong ability to learn independently, and goal-oriented tendency (Guglielmino, 1977). The OCLI is a 24-item Likert scale that measures personality traits related to an individual's ability to be self-directed (Oddi, 1986). This scale is more commonly used in continuing workplace learning due to its development in a professional context. The SDL Perception Scale developed in 1997 by Pilling-Cormick examines environmental factors that help or hinder a learner's ability to be self-directed as opposed to looking at individual personality characteristics, attitudes, or skills. All of these scales were designed within the traditional learning context of face-to-face interactions between learner and educator.

Early critiques of SDL theory focus on the notion of autonomy in learning, SDL as a prescribed process, and inconsistency in considering context both of the learner and the learning environment (Brookfield, 1988; Brockett & Hiemstra, 1991; Candy, 1991; Leach, 2000; Merriam & Caffarella, 1999; Usher, Bryant, & Johnston, 1997).

**Understanding SDL in the Online Context: Attributes and Processes**

Shapely (2000) stated that research in online distance education shows those learners need to have a high level of self-direction in order to succeed in online learning environments. The online learning context's impact on SDL is twofold: the amount of given or expected learner control and learners' self-perception of their levels of self-direction.

Song and Hill's (2007) conceptual model incorporated SDL as both a personal attribute and a learning process and added the third dimension of context to understand how environmental factors—in this case in the online environment—affect learner self-direction. The first two components of the model stemmed from the earlier literature and research on SDL and described how prior knowledge (input), combined with the learner's personal attributes and SDL process, can lead to the overall outcome of learning and satisfaction. The focus is on learner control and resources. Thus, context now becomes relevant, and the learning design, combined with learning support, will affect the final outcomes of learning and satisfaction (see Figure 1).
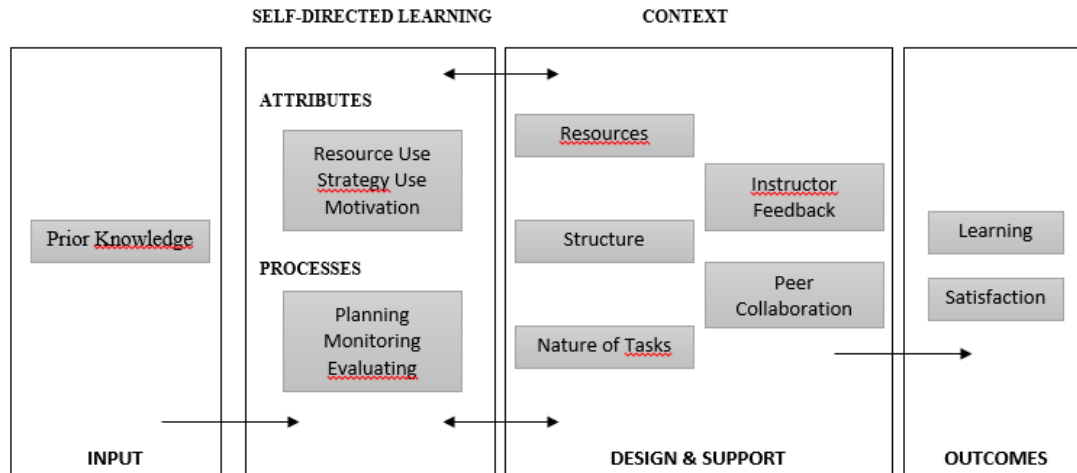
*Figure 1*. Conceptual framework for understanding SDL in the online environment. Adapted from "A Conceptual Model for Understanding Self-Directed Learning in Online Environments," by L. Song and J. Hill, 2007, *Journal of Interactive Online Learning, 6*(1), p. 31.

The context of online learning will have different effects on the personal attributes related to resource use, strategy use, and learner motivation (Song & Hill, 2007). In the online context, learners have access to a greater potential of resources, particularly in the written format, from not only themselves but also their peers and instructors. This access can give learners more time to reflect, which could lead to more meaningful learning. However, the issue of validity and reliability related to accessible information must now be considered in this context (Petrides, 2002). In terms of learner strategy as a personal attribute, the two key issues in the online context are communication and time management. Communication in this context is mainly in the written form as compared with the verbal form in the face-to-face learning environments; the written form can leave more room for misinterpretation. Timing of participation and response from both the learner and the educator also becomes a relevant issue in the online context.

Learner motivation must also be examined differently with a focus on learner procrastination and engagement to lead to meaningful learning as opposed to simply fulfilling obligations (Song & Hill, 2007). Fisher and Baird (2005) looked at learner motivation in the online context as twofold: self-directed motivation in regard to one's personal learning goals and as a need to meet the expectation of one's peers. This secondary component takes into account the collaborative aspect of the online learning environment. In addition to meeting the expectation of one's peers in terms of discussion and feedback, there is the expectation of assisting in the learning of the peers through the interaction and group involvement (Boyer, 2003).

Planning, monitoring, and evaluating one's own learning are steps in the SDL process that will be affected in the online context (Song & Hill, 2007). Learners have more control in the online environment, which means the flexibility and ability to create

their own learning spaces and sequences. It is the responsibility of the learners to monitor their own learning as well as to know when to seek assistance when they do not understand. In the online context, learners evaluate their own learning differently with feedback sometimes from peers instead of just the instructor. Boyer (2003) viewed this as a process of scaffolding with other learners as a support system in the online learning environment. These contextual differences in the online environment change the way scholars understand the learner's autonomous role in the various stages and learner responsibility in the SDL process.

## Understanding SDL in the Online Context: Technology and Transformations

Karakas and Manisaligil (2012) presented a model of five significant transformations in the way online context shapes SDL. Although SDL may be an autonomous process that can be seen as independent, not all of the learning must necessarily be done in isolation. The transformations that Karakas and Manisaligil identified all focused on the idea of collaboration as part of the SDL process. The first transformation, virtual collaboration, demonstrates the shift from the idea of learning in isolation to self-regulated learning in a more social and networked environment with collaborative production of knowledge and learning. This shift was also seen in Song and Hill's (2007) work where the SDL process was different in the online context due to the collaborative nature of self-evaluating learning through peer feedback.

A second transformation related to the interactive nature of the online context was through online communities, which further dictates that SDL does not need to take place in isolation. Online communities provide a social and interpersonal dimension that allows learners to pursue and share similar interests, expand their learning networks, and give and receive peer feedback. One example of such community is through service learning where learners use their learning to pursue positive global social change (Karakas & Manisaligil, 2012). This positive social change, or "call to action," is associated with the earlier literature on SDL goals (Merriam & Caffarella, 1999) that focused on social action and emancipatory learning.

Another transformation related to the technological convergence, which permits learners to access materials and resources through multiple communication channels, with technology as a branch that permits learners to work with others. For learners' self-direction, the process evolved from simply identifying their own learning needs to now adapting channels and tools to meet their needs and preferences. Technology permits flexibility as well as increased access for the learner. Global connectivity is one transformation that also affects the SDL process (Karakas & Manisaligil, 2012). Candy (2004) stated that global connectivity directly relates to SDL because it provides positive implications for economic competitiveness, personal fulfillment, and social inclusivity. Thus, this transformation of global connectivity links back to the emancipatory learning goal of SDL.

The final transformation, digital creativity, gives learners the freedom to customize and design their own learning based on their interests while still being held to the key processes of planning, implementing, and evaluating their own learning as identified in Brockett and Hiemstra's (1991) Personal Responsibility Model. With these

various transformations in the way scholars view SDL in the online world, clearly learner responsibility, control, and evaluation of learning are more significant than they were in the past in traditional learning contexts.

## Purpose of the Research

The purpose of this case study was to explore SDL in the context of the online learning environment from the perspective of both traditional and nontraditional learners. The process of SDL in the online context is explored in the stages of planning, monitoring, and evaluating one's learning from the learner's perspective thereby seeking to address the following research question: How do different learners describe the SDL process in the online context?

## Method

### Qualitative Case Study

This study was situated in the constructivist paradigm that permitted me "to help to construct the reality of the experience with the research participants" (Robson, 2002, p. 27). This was accomplished by designing interview questions that permitted the participants to explore learning activities that promoted the constructivist characteristic of knowledge construction. I used a case study approach. Creswell (2009) defined a case study as a strategy of inquiry in which the researcher explores a program, event, activity, process, or one or more individuals. More specifically, this exploratory case study uses a multiple case study with multiple embedded units of analysis (Yin, 2009). One case consists of the traditional learners, and the second case consists of the nontraditional learners. A comparison of these two cases is the focus of the analysis.

### Data Collection

Data in this study were collected from both survey instruments and participant interviews. These instruments include the SDLRS developed by Guglielmino in 1977 and the Online Learning Readiness Survey (OLRS) developed by Dray et al. in 2011. The in-depth participant interviews lasted 45-60 minutes in length and consisted of 12 open-ended questions designed for learners to reflect on their learning and behavior prior to, during, and after enrollment in an online course. My goal was to have 50 learners complete the SDLRS in order to obtain a sample of learners to complete the OLRS and the interviews; thus, I invited 150 learners to complete the SDLRS. From these 150, 30 surveys were returned completed. I then selected 20 of the 30 learners to continue in the study. The goal during selection of interview participants was to obtain a sample that was diverse in terms of student categorization as traditional or nontraditional as well as those with higher SDLRS scores (i.e., scores above 214, the average SDLRS score).

**The Participants**

The 20 undergraduate students who participated in the interviews for this study consisted of 12 females and 8 males. Ten of the students were classified as traditional learners and ranged in age from 18 to 22. Ten of the students were classified as nontraditional students with nine of those students in the age range of 25-35 and one in the 46-55 age range. Seven of the students were enrolled in a 2-year institution, and 13 of the students were enrolled in a 4-year institution. All of the participants in this study were in the process of completing or had recently completed an online course as part of a degree-seeking program.

**Data Analysis**

Data collected during the participant interviews were analyzed using the Miles and Huberman approach, which is composed of data reduction, data display, and conclusion drawing or verification (as cited in Robson, 2002). I established codes relating to the research themes and the research questions at two levels, working from attaching labels to groups of words to grouping these initial codes into themes or patterns. After each interview, a session summary sheet was used to document the crucial components of the interview related to the research questions. After a series of interviews, an interim summary of findings up to a certain date was prepared to uncover potential gaps or deficiencies in the data. Finally, conclusions were drawn based on the patterns, themes, and theoretical coherence (Robson, 2002).

## Findings

**SDLRS and OLRS**

Of 31 survey participants, 20 were classified as traditional learners and 11 as nontraditional learners. Half of the traditional learner participants obtained scores of 214 or higher, which qualified them to continue to the interview portion of the research project. Of the nontraditional learner participants, 90% obtained scores of 214 or higher, which qualified them to continue in the research project. One nontraditional learner with a score of 212 was selected to interview due to the learner's accessibility and interest in the study.

As previously stated, the SDLRS measures an individual's readiness for SDL. For the purpose of this study, participants who received scores that were average or above were considered potential subjects to continue in the research. Guglielmino (1977) stated that SDLRS scores could be improved over time as the skills measured with the survey instrument are skills that can be practiced. When comparing the two participant populations, 70% of nontraditional learners received scores considered above average, while only 20% of the traditional learners received scores of above average. Half of the traditional learner respondents received scores in the average category. In contrast, only 30% of nontraditional learners received scores in the average category, but two of those three individuals still received scores higher than the overall SDLRS

average of 214. Finally, 30% of traditional learner respondents received scores in the below average category, while no nontraditional learner scores fell into that category. Table 1 compares the overall SDLRS survey respondent scores.

Table 1. *Traditional-Nontraditional Learner SDLRS Summary Comparison*

| Responses | Traditional learners | Nontraditional learners | Respondent total |
|---|---|---|---|
| SDLRS started | 21 | 10 | 31 |
| SDLRS completed | 20 | 10 | 30 |
| Scores | | | |
|   Above average | 4 | 7 | 10 |
|   Average | 10 | 3 | 13 |
|   Below average | 6 | 0 | 6 |
| Selected to interview | 10 | 10 | 20 |

After selecting SDLRS respondents to participate in the interview, the OLRS was distributed to learners to assess their readiness for online learning. I used the first two major scales of the OLRS to obtain scores that could then be compared to and looked at in conjunction with the SDLRS. The first scale examined learner characteristics specifically in the areas of self-efficacy and locus of control. The second scale explored information and communication technology. It was expected that the first scale related to learner characteristics would provide results similar to the SDLRS and that the second scale, technology, would provide data on level of comfort with technology, which could then be explored further during the interviews. Twenty participants selected for interviews were asked to complete the OLRS. Of the 20 surveys, 18 completed surveys were received. Ten of the 18 completed surveys were from the traditional learners, and eight were from the nontraditional learners (see Table 2).

The learner characteristic scale comprised two subscales, one for self-efficacy and one for locus of control. The self-efficacy scale explored areas related to written communication, autonomy, collaborative work, and providing feedback to others. The locus of control scale focused on the areas of time management, adjusting behaviors for learning, and goal setting. The scoring instructions (Dray et al., 2011) were used to obtain a score for each of the two areas for each learner.

The mean self-efficacy score established by the original researchers (Dray et al., 2011) was 3.26. A mean score of 2.70 to 3.70 would be considered average, below 2.70 would be considered low, and above 3.70 would be considered high. Eighty percent of the traditional learners fell into the average self-efficacy category, and 20% had scores that classified them as having high levels of self-efficacy. Although the majority of traditional learners are considered average based on the range, half of them had a mean score higher than the overall average of 3.26. In comparison, 63% of the nontraditional

learners fell into the average self-efficacy category, and approximately 36% obtained scores that classified them as having a high level of self-efficacy. Seven of the eight nontraditional learners had mean scores above the overall mean of 3.26.

Table 2. *Summary of OLRS Learner Characteristic Mean Scores*

| Learner | Self-efficacy | | Locus of control | |
|---|---|---|---|---|
| | Mean score | Rating | Mean score | Rating |
| T#1 | 3.2 | Average | 2.7 | Average |
| T#2 | 2.8 | Average | 2.8 | Average |
| T#3 | 3.0 | Average | 3.0 | Average |
| T#4 | 3.0 | Average | 3.5 | Average |
| T#5 | 4.0 | High | 3.6 | Average |
| T#6 | 3.6 | Average | 3.2 | Average |
| T#7 | 3.6 | Average | 3.0 | Average |
| T#8 | 3.8 | High | 3.8 | High |
| T#9 | 3.3 | Average | 2.6 | Low |
| T#10 | 3.0 | Average | 3.0 | Average |
| NT#1 | 4.0 | High | 3.8 | High |
| NT#2 | 3.1 | Average | 3.2 | Average |
| NT#3 | - | - | - | - |
| NT#4 | 3.6 | Average | 3.5 | Average |
| NT#5 | 3.8 | High | 3.0 | Average |
| NT#6 | 3.4 | Average | 3.2 | Average |
| NT#7 | 3.8 | High | 3.4 | Average |
| NT#8 | 3.3 | Average | 3.6 | Average |
| NT#9 | 3.6 | Average | 3.8 | High |
| NT#10 | - | - | - | - |

*Note*. - represents unavailable data because the survey was not completed

The mean locus of control score established by the original researchers was 3.19. A mean score of 2.70 to 3.60 would be considered average, below 2.70 would be considered low, and above 3.6 would be considered high. Most of the traditional learners had mean scores within the average range. One traditional learner fell into the low level and one fell into the high level. Four of the 10 traditional learners had mean scores above the overall average of 3.19. Six nontraditional learners fell into the average category for locus of control and two were considered to have a high locus of control. All except one had mean scores above the overall average of 3.19.

The results of the OLRS complemented the results of the SDLRS in that the majority of learners, both traditional and nontraditional, fell into the average range with

many above the overall mean for both self-efficacy and locus of control. The data from the learner characteristics scale, with the subscales of self-efficacy and locus of control, align with the data from the SDLRS. Participants who completed the OLRS had scored at or above average on the SDLRS, so the alignment is not unexpected. It was expected the OLRS results would be similar to the SDLRS because the OLRS was developed from other learning readiness scales (Bernard et al., 2004; Warner et al., 1998). A major difference in the OLRS from other learning readiness instruments, including the SDLRS, is its inclusion of the information and technology scale that explores technology access, use, and skill.

The findings from the interviews did not reveal substantial differences in how the traditional and nontraditional students discussed SDL in the online context. Instead, small nuances between how the traditional and nontraditional learners describe SDL in the online context are seen in two areas: readiness for SDL in the online context and the SDL process in the online context.

**Readiness for SDL in the Online Context**

Both traditional and nontraditional learners identified (a) awareness of one's own learning preferences, (b) considering oneself technologically savvy, and (c) being goal oriented as factors that may affect their success in the online learning context. Traditional learners described learning in the online context as an autonomous process, and their goals tended to be related to personal accomplishments. Nontraditional learners described learning in the online context as a way to achieve personal and professional goals in a flexible and sometimes accelerated format.

When speaking about awareness of one's own learning preferences, the learners spoke about the ability and desire to engage in autonomous learning, the preference to seek out information and assistance, and a willingness to be open to new points of view. The ways in which the two types of learners discussed autonomy differed from simply working alone to learn to learning on one's own. The traditional learners spoke more about autonomy in the context of being able to work alone in a time and place that was convenient to them. The nontraditional learners spoke about autonomy in how they engaged in the learning process. In his own words, one traditional learner spoke about the flexibility of the online class to work on his own: "I preferred the online class. It was like on your own, not at your own pace, but like do-it-yourself." In contrast, a nontraditional learner spoke about how she felt she was learning by creating her own materials, which helped her to learn: "I actually had to go through and I think I outlined the entire textbook myself in detail, and I probably did it twice over. I did this and was constant in repeatedly drilling something into my head." She described outlining information and studying it until it clicked in her head as opposed to having the information delivered to her or asking questions and waiting for responses or direction.

Both traditional and nontraditional learners expressed that they considered themselves technologically savvy, but how they described their experience in terms of access and use and their level of self-efficacy had an impact on their learning in the online context. All participants discussed access to technology in general and to different types of technology including personal computers, laptop computers, tablets,

and smartphones. They also described various web-based and software programs they used regularly. Most of the learners used web-based programs for productivity, which allowed them to access their work from multiple locations and devices. These programs include Google Docs, Evernote, and institutional learning management systems with web-based storage. Learners also described the use of software such as Microsoft Office and the Apple products Pages, Keynote, and Numbers that mirror the Microsoft productivity tools. The main difference in how the learners described their experience related to the nontraditional learners discussing the impact of how using technology in the workplace provided them with more experience using different applications and devices, leading to increased self-efficacy when using these tools for their education.

Finally, learners described being goal-oriented both in terms of academic goals and professional goals as a factor related to readiness for online learning that would contribute to their success. The academic goals related to completing a degree in an established time frame in order to pursue other goals. The professional goals were related to career transitions, promotional opportunities, and the overall perception that obtaining a degree would have positive implications in the workplace.

**SDL Process in the Online Context**

In the online context, all learners described the SDL process with steps in course selection, organization, and routine setting; self-monitoring strategies, including following a prescribed outline, ongoing communication and interaction, and awareness to modify one's practices when necessary; and evaluation methods, including a blend of traditional assessment and formative feedback delivered with virtual tools.

Learners were asked about the actual decision to take an online course and then how they planned for their online course prior to and at the start of the course. Some examples of how the learners planned in terms of course selection, organization, and route setting are illustrated as follows:

- "I needed to take a certain class, but the times it was offered face-to-face wouldn't work with my schedule. I hesitated to take it online, but when I saw the instructor who was teaching it, I felt I would be able to try it since I knew that person and her teaching style."
- "I actually had this professor before, but this class was offered only online. So, I got the same professor who I loved, but this time he was only teaching online. I believe the reason for that was that he wasn't going to be on campus."
- "I kept a day planner, with my assignments for the week written out in my book. I'd write the due times in my calendar and my phone calendar, and on my desk calendar to double check myself. I used a lot of those types of tools—organizational tools to keep myself abreast of everything that needed to be handed in."
- "I would ensure that I had all of the information from the professor at the start of the class. I found it important to adhere to deadlines, so I got them from the syllabus and put them on my calendar. I didn't want to get buried in the work by doing everything the last two weeks of the course. I kept myself on task and I

set aside time like I would if I was in a traditional learning situation."
- "I would log in to Sakai each morning and check on any posts from the day before. Then, I would make it routine to check in, either on my phone or laptop, while I was in the classroom waiting for another class to begin. I also logged in after dinner."
- "I made it a routine to come to school early, an hour or so before class, to go to the library to work on my online class. This wasn't a requirement, but this helped me to always have a set time to work on my assignments."

Learners were asked to talk about the ongoing nature of the work during the course and more specifically how they kept up with the coursework. Some examples of how the learners monitored their own learning in terms of following a prescribed outline, ongoing communication and interaction, and an awareness to modify one's practices when necessary are illustrated as follows:

- "Everything, all of the assignments from the week before, were always due on Monday. Knowing that I always had work to complete for Monday helped me stay on top of the work."
- "We were given an outline of what was expected for the class—what should be done and when. I tried to really follow that, either ahead of the game or at least keep up with what the professor said, so I wouldn't fall behind."
- "Sometimes what I would have to do is write a little sentence at the bottom saying, 'please let me know if you got my email,' so then I would know that it was received."
- "On the message boards, there were live chats going on so you can just pose questions. We were able to talk back and forth, just like a massive chat room. The professor would sometimes be present at a scheduled time, and otherwise it was those in the class."
- "When you're in the classroom, most of your assigned reading is covered in class, so if something is not interesting, you might just skip over it, knowing the professor will address it. With the online class, I found that things were addressed in audio PowerPoint, but that I really needed to read and re-read in order to get it."
- "With the first test, I didn't have trouble with the material itself, but I had trouble trying to show the work with the tool they wanted you to use. It was like a notepad section that functioned like paint, with lots of dragging. I scanned my hand-written work, but for the first test he (the professor) didn't give me credit. I wasn't able to finish the test on time when using this system to show the work. For the second test, I made sure I spent time using this notepad tool on the practice problems so I would be able to work quicker."

Learners were asked to provide an example of how they assessed their own learning. When discussing how the learners evaluated their own learning in the online context, they spoke about formative and summative assessment in the following ways:

- "Even though it was an online class, we had to come to school to take the exams. Although this helped check if we were learning, it seemed like it was in place to make sure we were serious about the work."
- "So, if you got something wrong for the first time, it would give you immediate feedback and say no, that wasn't right kind of thing. You were then allowed to try again for partial credit. There was also a chance to watch how a similar problem would be solved, like a hint."

## Limitations

This study is limited by the methodology of exploring the differences between traditional and nontraditional learner experiences in an online course. The participants were from different institutions, engaged in courses in different disciplines, and at different levels in their academic courses. The study did not ask the students to compare their online experience with their other traditional-format learning experiences. It was an exploratory study with the purpose of uncovering themes that can be explored further with additional work.

## Discussion and Implications for Future Research

The purpose of this research was to explore SDL in the online context from the perspective of traditional and nontraditional undergraduate learners. Four major analytical categories developed from the research findings. These categories include (a) the definition of the online learning environment, (b) learner control in the online learning environment, (c) the impact of technology and self-efficacy on readiness for SDL in the online environment, and (d) technology as a catalyst for shifting perspectives on the SDL process. The analysis integrated this study's findings with the literature that guided this study, focusing on the small differences between traditional and nontraditional learners.

The key characteristics of the online learning environment that remain static are physical separation of the learner from the instructor and other learners and the use of technology to facilitate instruction. The learners discussed how the instruction was delivered electronically and how almost all their interactions with the instructor and other learners were online interactions with virtual tools. As technologies evolve, some characteristics of the online learning environment may shift, but these elements appear to remain the defining characteristics of this learning context.

When analyzing learner control in the online context, I considered the learners' descriptions of elements of increased control over their own learning in terms of anytime, anyplace learning and in terms of the learning activities in which they engaged during the course. This aligns with Boud and Bridge's (1975) dimensions of self-direction in terms of pace and method. Specifically, the constructivist nature of the online learning environment leads to increased learner control and self-direction.

Learner self-efficacy and technology access, use, and skills impact readiness for SDL in the online context. The learners discussed prior and current professional and personal experiences with technology that increased their confidence in their abilities to

learn in the online context. The learners also described organization and time management and a strong focus on written communication, which aligns with Song and Hill's (2007) conceptual model of SDL in the online context in the areas of resource and strategy use.

The last analytical category explored technology as a catalyst for shifting perspectives on SDL in the online learning environment. The learners described experiences in their online course that incorporated various elements of Karakas and Manisaligil's (2012) five dimensions of SDL in the online context with a focus on collaborative work and online communities. While retaining autonomy in the individual's learning process, the SDL processes of planning, monitoring, and evaluating one's learning are explored with technology as a driver for a more integrative learning process.

After careful review of this study's findings and an analysis of those findings with the extant literature, this study contributes to the literature on SDL in the online context in terms of learner experiences and perspectives that address learner control, online collaboration, and resource and strategy use as part of the SDL process. As the online learning environment evolves based on emerging technologies, these perspectives on SDL—as both a personal attribute and a process—can continue to be explored in different ways and from different perspectives.

With much of the research on self-directed learning rooted in traditional learning environments, continued research is necessary to explore the theory in learning settings other than the traditional face-to-face environment. The data in this research study support that continued research and would be relevant in (a) increasing self-direction through learning in the online learning environment, (b) SDL in alternative online contexts, (c) exploring learning activities that promote self-direction in the online context, and (d) comparing the SDL process in the traditional face-to-face learning environment and the online learning environment.

The effect of technology on the SDL process in the online context will continue to evolve as new technologies emerge and the demands for flexible learning formats persist. Research in this area will help institutions and educators to understand not only how to prepare learners to engage in the online learning context but also to help them to be successful and become more aware of their levels of self-direction throughout their learning in both formal and informal contexts.

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# ARE TEACHERS SELF-DIRECTED? AN EXAMINATION OF TEACHERS' PROFESSIONAL LEARNING

## Kelly E. McCarthy and Waynne B. James

This survey research was conducted to better understand the informal professional learning practices of mathematics teachers. Two large public school districts participated. Data were obtained using the Teachers' Opportunity to Learn instrument. Four areas of informal learning were captured: (a) teacher collaboration, (b) mentoring/coaching, (c) informal communication, and (d) individual learning activities. Every teacher in the study engaged in at least one informal learning endeavor over the prior 12 months. Individual learning activities had the highest amount of participation. When the data were analyzed by demographic variable, 12 areas of statistical significance were found. Mentoring/coaching activities had the most statistically significant results. The findings from this study challenge existing professional development models, emphasize the need for policy and funding changes at the federal and state levels, and bolster support for more self-directed learning in teacher development programs.

There is no shortage of research on the topic of teacher professional development. Over the last four decades, the research and education communities have sought to find ways to make professional learning more meaningful for teachers (Desimone, 2009, 2011; Desimone, Smith, & Ueno, 2006; Griswold, 2005; Hawley & Valli, 2005). The push to support these activities is grounded in the belief that professional development is an effective vehicle to address pertinent issues and actions in education as professional learning activities can be used to implement curriculum reform, improve the instructional practice of educators, and potentially raise the academic achievement of students (Akiba, 2012; Cervero, 2001; Desimone, 2009; Young, 1998).

The support for professional development is evident in both educational policy and federal funding. Congressional actions such as *No Child Left Behind* and the *Common State Core Standards* impose rigorous requirements for both districts and teachers (Griswold, 2005; Torff, Sessions, & Byrnes, 2005; Van Driel & Berry, 2012). Since professional development is seen as the most efficient and effective way to ensure research-based teaching practices and aligned curriculum initiatives are being implemented appropriately in the classroom, budgetary appropriations were made to

support these pertinent objectives.  Over a 10-year period from 2005-2014, the U.S. Department of Education provided over $26 billion in federal funding to improve the efforts of principals and teachers (U.S. Department of Education, 2014) with the expectation that this professional development would ensure students met the necessary content and achievement benchmarks for their specific grade levels (Birman et al., 2009; Griswold, 2005).

While professional development is supported at the federal, state, district, and individual levels, there has been a lack of research investigating the context in which teachers choose to learn (Akiba, 2012; Putnam & Borko, 2000). Most research has utilized national survey data (Birman et al., 2009; Desimone et al., 2006; Smith & Desimone, 2003; Strizek, Tourkin, Erberber, & Gonzales, 2014). This is problematic as these surveys gather information on a variety of topics and teacher professional development represents only a fraction of what is collected. To address this gap in knowledge, researchers are now beginning to develop targeted studies that focus on both the formal and informal learning activities of teachers. By studying the vast array of professional development teachers engage in, education agencies can better design teacher learning programs and improve the policy behind and funding of professional development (Akiba, 2012). This study sought to add to existing literature by studying the context in which professional learning occurs with middle and high school mathematics teachers.

## Literature Review

Professional learning transpires when teachers seek opportunities to improve upon their existing knowledge base and gain new skills in an effort to improve instructional practice or student learning. These activities can be formal or informal in design. Formal learning is often "institutionally sponsored or highly structured, i.e., learning that happens in courses, classrooms, and schools, resulting in learners receiving grades, degrees, diplomas, and certificates" (Dabbagh & Kitsantas, 2012, p. 4). Informal learning is more self-directed where the participants plan and execute the learning activity. New knowledge is constructed through exploration, observation, collaboration, daily practice, and reflection. Informal learning allows teachers to own the content and the delivery methods of their learning while formal professional development enables teachers to acquire foundational teaching skills and gain in-service credit for licensing renewal (Dabbagh & Kitsantas, 2012). Both methods are valuable to the development of teachers and should be supported through diverse programmatic initiatives (Akiba, 2012).

### Types of Professional Learning

Eraut (2004) classified professional learning into three categories: deliberative, reactive, and implicit. Deliberative learning occurs when information is sought to fulfill a learning objective and can occur in both formal and informal contexts. An example of formal deliberative learning is when a teacher participates in a traditional district-sponsored in-service workshop. An example of informal learning would be when a

teacher researches a specific topic or observes the classroom of another teacher in order to learn a particular skill. Reactive and implicit learning occur only in informal settings. Reactive learning is when an individual learns something but did not engage in the activity with the intention to learn. An example is when a teacher learns something new during a casual conversation with a colleague. Implicit learning is when the acquisition of a skill is acquired subconsciously, which is often referred to as tacit knowledge. The development of tacit knowledge frequently occurs when teachers develop classroom management skills. After repeated interactions with students, a teacher organically develops improved classroom management competencies.

As Eraut (2004) illustrated, the context in which teachers choose to learn is critically important to the learning experience. Decisions to engage in a particular activity may be based not only on the content to be learned but also on the context in which the learning will take place. Often, the physical and social contexts become a part of the learning activity and may directly influence the outcomes of the learning itself (Putnam & Borko, 2000). Therefore, it is not only important to understand the topics that teachers choose to learn about but also the environments in which they choose to spend their time learning.

**Modes of Professional Development**

The literature provides a variety of models and classifications for the implementation of teacher professional development. Hall (2007) contended that all professional development can be categorized into one of three categories: district-wide, site-based, and individual-improvement. District-wide professional development provides an economical way to push curriculum initiatives and instructional practices to teachers who represent a variety of grade levels and content areas (Guskey, 2000). Decisions on what is provided at these training sessions are often determined by formal needs analyses with the intention to fill gaps identified by administrators and teachers. However, this type of professional development has often been criticized for addressing the needs of the district over the actual learning needs of teachers (Guskey, 2000).

Site-based professional development is designed to address the unique challenges of individual school sites. It "emerges from local needs and interests; is relevant to the teachers, students, and school communities; and is open to a wide variety of methods" (King-Rice, 2001, p. 20). Site-based development occurs when teachers and administrators come together to plan, implement, and evaluate their learning. The focus is on student achievement, and participants are encouraged to discuss pressing issues in an effort to develop solutions and to learn from one another (Garet, Porter, Desimone, Birman, & Yoon, 2001). This is seen as an effective method of professional development and is facilitated through coaching, mentoring, self-directed learning projects, and action research activities (Hall, 2007).

Individual-improvement professional development represents the self-directed learning activities of teachers. Brookfield (1995) asserted that adults are inherently self-directed and that edification best occurs when individuals are empowered to direct the design, execution, and evaluation of their own learning. The impetus behind self-directed learning is often a result of critical reflection. Reflection-oriented learning has

been shown to help teachers further develop their teaching practices as it expands their existing knowledge base of teaching and learning (Tillema, 2000). Self-reflection serves as a compass during the learning process, enabling an individual to make adjustments throughout their learning journey (Gower & Cunningham, 1995). Mushayikwa and Lubben (2009) argued that self-directed professional learning is a key determining factor in the overall effectiveness of teacher professional development as teachers are continuously engaged in self-directed learning regardless of whether their efforts are supported at higher administrative levels. The teacher and their institution form a symbiotic relationship in which the teacher identifies the needs of the institution and through empowerment develops an individual plan to address those needs through learning. The individual-improvement model improves teachers' readiness toward self-directness; educators learn to address their own needs and their students' needs all while providing opportunities for transformational growth both inside and outside the classroom (Hall, 2007; Strods, 2014).

## Key Components to Effective Professional Development

Whether learning is formally or informally organized or whether it occurs individually or in groups, research has shown that quality professional development can be achieved if a few key components are incorporated into the learning experience. First, learning objectives must be defined to ensure that desired outcomes are aligned with those objectives (Garet et al., 2001; Hall, 2007; Magestro & Stanford-Blair, 2000). Second, those participating in the development should have similar backgrounds or educational interests so that the learning can be focused, direct, and individualized (Boyer, Edmondson, & Artis, 2013; Dass & Yager, 2009; Garet et al., 2001). Third, the activities utilized should be varied, focused on classroom application, incorporate adult learning principles, and provide opportunities for active learning (Birman et al., 2009; Dass & Yager, 2009; Desimone, Porter, Birman, Garet, & Yoon, 2002; Desimone, Porter, Garet, Yoon, & Birman, 2002; Garet et al., 2001; Hall, 2007; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Magestro & Stanford-Blair, 2000; Sparks, 2002). Finally, professional development is proven to be most successful when participants create an implementation plan for their own classroom, reflect on the implementation after it has occurred, and utilize follow-up resources for continued support (Dass & Yager, 2009; Hall, 2007; Magestro & Stanford-Blair, 2000).

## Prior Studies of Teacher Self-Directed Professional Learning

Prior research indicates that professional development is facilitated in a variety of contexts and that learning can occur both explicitly and implicitly (Eraut, 2004; Garet et al., 2001; Guskey, 2000; Hall, 2007; King-Rice, 2001). Although the professional development literature has focused on system-controlled or centrally-organized professional development (Mushayikwa & Lubben, 2009), several researchers have conducted large- and small-scale studies to better understand the self-directed professional development activities of classroom teachers. Smaller, Clarke, Hart, Livingstone, and Noormohamed (2000) studied the professional learning habits of 753

elementary and secondary teachers. Participants were asked to report all their professional learning over the prior 12 months. Teachers reported spending 8 hours per week preparing for lessons and 4 hours per week engaging in self-directed learning efforts. Smaller, Hart, Clarke, and Livingstone (2001) continued the research with a subsequent qualitative follow-up study of 13 teachers. The findings revealed that teachers spent even more time on informal learning activities than captured by the previous study. Teachers indicated they spent an average of 7 hours per week on self-directed learning initiatives that included collaborative meetings with colleagues, informal conversations with coworkers, and researching content and resources using print and digital media.

Mushayikwa and Lubben (2009) interviewed 55 science and mathematics teachers to identify the motivating factors behind their self-directed professional development. They identified seven factors that represented two main themes: professional efficacy and classroom efficacy. To improve professional efficacy, teachers engaged in individualized development to assist with career advancement, provide opportunities for networking, and build upon their professional identity. In order to improve their classroom efficacy, teachers pursued individualized development to improve their content knowledge, to learn how to integrate and adapt various materials in their instructional planning, and to engage in more critical reflection on their teaching and student performance.

Akiba (2012) studied the professional learning habits of 577 mathematics teachers across the state of Missouri. She found the most common form of professional development was individual self-directed learning activities. Teachers spent an average of 36.1 hours per month on these learning initiatives. They also spent 4.1 hours per month informally collaborating and communicating with colleagues to improve instructional practices.

One of the largest international studies of teacher professional development was conducted by the Organization for Economic Co-operation and Development. In 2013, they administered the Teaching and Learning International Survey in more than 30 countries. Strizek et al. (2014) reviewed the results and found that annually U.S. teachers spent 32.5 hours on mentoring and coaching activities, 13.3 hours observing other school sites or classrooms, 47.4 hours networking with teachers for the purpose of professional development, and 41.1 hours on individual learning efforts. In comparison to their international colleagues, U.S. teachers spent 10 hours more annually on collaborative professional development efforts and individual learning endeavors.

Effective teacher professional development can take place in both highly structured and self-directed settings. Depending on the context and content being learned, teachers will engage in deliberate, reactive, and implicit learning. These situations can be organized at the district-, site-, or individual-levels. In order for them to be effective, they must have defined objectives, incorporate adult learning principles, provide opportunities for trial and error, and build in evaluation and follow-up support components. Finally, research has shown that teachers are regularly engaging in a variety of self-directed professional development efforts to improve their knowledge, skills, and abilities as educators. In order to better understand the self-directed learning

efforts of teachers, more studies need to be conducted to capture the context and frequency by which this learning occurs.

## Method

This survey research study was conducted to gather information about the types of professional development middle and high school mathematics teachers engaged in to improve their knowledge, skills, and abilities as educators. There were three research objectives for this study. The first was to identify the types of activities teachers participated in as part of their professional development. The second objective was to quantify how frequently teachers took part in these activities. The third objective was to determine if there were statistically significant differences in participation and frequency based on the demographic variables of the participants.

### Participants and Procedures

Two large public school districts participated in the research. These districts were part of the top 25 largest school districts in the United States at the time of the study. They served rural, suburban, and urban student populations who were diverse both ethnically and socioeconomically. The districts were comprised of traditional, charter, virtual, alternative, K-8, career-technical, and adult schools. In order to participate, teachers had to be employed full-time and teach at least one section of mathematics during the day. For the K-8 schools that participated, only 6th, 7th, and 8th grade mathematics teachers were solicited to take part in the study. Teachers were recruited via email, and their responses were collected using an online survey.

### Instrument

The online survey included a series of demographic questions and an adapted version of the Teachers Opportunity to Learn (TOTL) instrument (Akiba, 2012). The TOTL was originally developed as part of a National Science Foundation grant in order to better understand the professional learning habits of middle school mathematics teachers. Thus far, it has been used with teachers in Missouri and Florida.

The online survey consisted of two parts. The first section asked a series of demographic questions that included (a) school setting (middle or high school), (b) years of teaching experience (0-5 years, 6-10 years, or 11 or more years), (c) level of education (bachelor's degree or master's and above), (d) degree major (mathematics education, mathematics, or "other" degree), (e) certificate type (permanent or temporary), and (f) school's Title I status (Title I eligible or not Title I eligible). The second portion of the survey, the TOTL, collected information about the teachers' professional learning habits from the last 12 months. There were seven areas of professional development that were measured which consisted of (a) professional development programming, (b) teacher collaboration, (c) university/college courses, (d) professional conferences, (e) mentoring/coaching, (f) informal communication, and (g) individual learning activities. For each of these categories, participants were asked to

indicate if they participated in the activity, and if so, they were then asked to specify the frequency in which they participated using provided ranges. Some categories asked for annual time spent (professional development programming, teacher collaboration, university/college courses, and professional conferences) while others asked for a monthly average (mentoring/coaching, informal communication, and individual learning activities).

## Analysis

Several statistical methods were utilized in this study. Descriptive statistics were reported for the first and second research objectives. These metrics included mean, standard deviation, participation percentages, and confidence limits. To address the third research objective, independent means $t$ tests, one-factor analysis of variance (ANOVA), and chi-square test of independence were utilized. On the TOTL, respondents selected from a series of intervals to indicate time spent on each activity. In order to use $t$ tests and ANOVA, the data had to be coded prior to analysis. To do this, the median from each reported interval range was used for the calculations. For example, if the participant selected 4-6 hours for an activity, this was replaced with the number 5 in the data set. Each interval response was coded with the median before the analyses were completed.

## Findings

While the TOTL captured both formal and informal professional development, this article focuses only on the informal learning activities of the participants. The four informal learning categories on the TOTL were (a) teacher collaboration, (b) mentoring/coaching, (c) informal communication, and (d) individual learning activities. In this study, teacher collaboration was defined as established activities that foster teacher interaction. These could include teacher forums or networks, study groups, or professional learning communities. Although teacher collaboration time is often mandated by districts or schools, the content of these meetings are typically determined by the participants. Mentoring/coaching activities were defined as formal partnerships established between new and veteran teachers to support teacher induction. Informal communication was described as unplanned exchanges between teachers to improve practice. Individual learning was comprised of any activities that were self-directed by the participants.

### Frequency of Professional Development Participation

The results of the survey revealed that teachers were actively engaging in professional development. Individual self-directed learning proved to be the most common activity; all but two teachers, 99.18%, reported taking part in some type of individual learning endeavor. The vast majority of the respondents, 82.04%, participated in teacher collaboration activities. A little over two-thirds, 66.53%, engaged in informal communication with colleagues. Mentoring/coaching activities had the lowest

participation with 30.61% of the respondents taking part in this activity. A summary of the participation information and confidence limits by category are presented in Table 1.

Table 1. *Participation by Activity*

| Activity Type | Participated | | Confidence Limits* | |
|---|---|---|---|---|
| | *n* | *P* | Lower | Upper |
| Individual Activities | 243 | 99.18 | 98 | 100 |
| Teacher Collaboration | 201 | 82.04 | 77 | 87 |
| Informal Communication | 163 | 66.53 | 61 | 72 |
| Mentoring/Coaching | 75 | 30.61 | 25 | 36 |

*Note. N* = 245. *95% confidence level.

## Time Spent By Professional Development Category

Analysis of the time spent also highlighted variations in participation based on the professional development category. Collaboration and communication with peers proved to be frequent activities for the teachers in this study. Participants spent 33.67 hours (*SD* = 37.38) annually on teacher collaboration activities. This would equate to 3.37 hours per month based on a traditional 10-month teaching appointment. Respondents spent a similar amount of time per month informally communicating with their peers (*M* = 3.01, *SD* = 3.77). Lesser time was spent on mentoring/coaching activities (*M* = 1.25, *SD* = 2.63) when compared to the other professional development categories measured in this study. A breakdown of the means, standard deviations, and confidence limits for each professional development activity type are presented in Table 2.

Teachers spent the overwhelmingly majority of their time, 36.62 hours (*SD* = 31.91) per month, on individual learning activities. Most of this time was dedicated to reflecting on practices by evaluating student work (*M* = 12.17, *SD* = 10.82). Teachers also spent time developing assessment tools to measure formative learning (*M* = 8.71, *SD* = 8.89) and searching for resources to enrich the curriculum and their instruction (*M* = 8.27, *SD* = 8.58). Respondents were also given the opportunity to write in "other" activities that were not explicitly stated in the TOTL. A review of the responses revealed many activities that would have fallen under the subcategories listed in the survey. There were, however, some submissions that fell outside the purview of the survey. Additional activities included developing shared instructional materials for department use; creating new curriculum to support district-mandated content; constructing online study spaces/resources for students; writing Individual Education Plans and developing differentiated instruction materials; and creating science, technology, engineering, and mathematics (STEM) enrichment activities. A breakdown

of the descriptive statistics for the individual learning subcategories are presented in Table 3.

Table 2. *Time Spent by Activity*

| Activity | M | SD | Confidence Limits* | |
|---|---|---|---|---|
| | | | Lower | Upper |
| *Hours per Year* | | | | |
| Teacher Collaboration | 33.67 | 37.83 | 28.91 | 38.43 |
| *Hours per Month* | | | | |
| Individual Activities | 36.62 | 31.91 | 32.60 | 40.63 |
| Informal Communication | 3.01 | 3.77 | 2.54 | 3.48 |
| Mentoring/Coaching | 1.25 | 2.63 | 0.92 | 1.58 |

*Note.* $N = 245$. *95% confidence level.

Table 3. *Breakdown of Individual Learning Activities*

| Activity | P | M | SD | Confidence Limits* | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| Analyzing and evaluating student work | 96.73 | 12.17 | 10.82 | 10.81 | 13.53 |
| Researching and developing student assessment tools and materials | 95.92 | 8.71 | 8.89 | 7.59 | 9.83 |
| Searching web-based sites for curriculum and instructional resources | 96.32 | 8.27 | 8.58 | 7.19 | 9.35 |
| Reading the teacher's manual for adopted textbook(s) | 76.73 | 5.00 | 7.71 | 4.03 | 5.97 |
| Reading professional journals or books on mathematics teaching and learning | 59.18 | 2.47 | 4.37 | 1.92 | 3.02 |
| "Other" activities | 25.31 | 3.10 | 8.14 | 2.08 | 4.13 |

*Note.* $N = 245$. *95% confidence level.

## Statistically Significant Findings by Professional Development Activity

Three inferential statistical techniques were utilized in this study: independent means *t* tests, ANOVA, and chi-square test of independence. These methods were employed to determine if there were statistically significant differences in participation and time

spent when analyzed by the demographic variables of the participants. Significant differences were found for three of the four activities. Individual learning was the only professional development category that did not generate significant results due to participation percentages and mean time spent being relatively similar across the demographic variables. The other three professional development categories generated significant results; mentoring/coaching activities had the greatest amount of differences among the demographic variables.

*Teacher collaboration and informal communication activities.* When teacher collaboration was analyzed by school type, significant results emerged. Independent means *t* tests revealed middle school teachers spent significantly greater amounts of time on teacher collaboration activities than high school teachers, $t(243) = -2.33$, $p = .0208$. Middle school teachers also had significantly higher participation percentages compared to high school teachers, $\chi^2(1, N = 245) = 7.61$, $p = .0058$. Differences were also found when informal communication was analyzed by school setting. Middle school teachers participated significantly more often in informal communication than high school teachers $\chi^2(1, N = 245) = 4.96$, $p = .0259$.

*Mentoring/coaching activities.* Although only a third of the participants engaged in mentoring/coaching activities, this category had more statistically significant findings than any other activity captured by the survey. Post hoc Tukey tests indicated that new teachers (0-5 years) spent significantly greater amounts of time on mentoring/coaching activities than mid- and advanced- career teachers, $F(2,242) = 10.94$, $p < .0001$. Teachers in the first 5 years of their career also participated significantly more often in mentoring/coaching activities than the teachers with 6 or more years of experience $\chi^2(2, N = 245) = 25.8951$, $p < .0001$.

When degree level was analyzed, teachers with a bachelor's degree spent greater amounts of time engaging in mentoring/coaching activities than those with a master's degree, $t(243) = 2.23$, $p = .0269$. There was a significant relationship between teachers who held a bachelor's degrees and their participation in mentoring/coaching activities $\chi^2(1, N = 245) = 10.8582$, $p = .0010$. In addition to degree type, educators who majored in mathematics or "other" degree areas were less likely to participate in mentoring/coaching activities than teachers who majored in mathematics education $\chi^2(2, N = 245) = 6.15$, $p = .0463$.

Certificate type also produced significant results. Teachers with temporary certificates spent significantly larger amounts of time on mentoring/coaching activities than teachers with permanent certificates, $t(30.917) = -4.48$, $p < .0001$. They also participated significantly more often in mentoring/coaching activities than teachers with permanent certificates $\chi^2(1, N = 245) = 45.19$, $p < .0001$. Lastly, teachers employed by Title I schools spent significantly more time on mentoring/coaching activities than teachers at non-Title I schools, $t(191.91) = -4.22$, $p < .0001$, and they were more likely to participate in mentoring/coaching activities than teachers at non-Title I schools $\chi^2(1, N = 234) = 14.95$, $p = .0001$. A breakdown of the statistically significant findings are presented in Table 4.

The teachers in this study actively engaged in a variety of informal learning activities. Every respondent participated in at least one activity over the last 12 months with 70.60% of the teachers engaging in three of the four activities captured by the survey. Individual learning activities and teacher collaboration proved to be the most popular activities. When teacher demographics were analyzed, significant differences emerged. Middle school teachers engaged in more collaboration and communication activities with their peers than high school teachers. Participation and time spent on mentoring/coaching activities were significant for teachers with 0-5 years of experience, bachelor's degrees, temporary certificates, and those from Title I schools. Teachers who majored in mathematics education were also more likely to take part in mentoring/coaching activities.

Table 4. *Statistically Significant Findings*

| | Teacher Collaboration | Informal Communication | Mentoring/ Coaching |
|---|---|---|---|
| School Setting | $\chi^2$ (.0058) $t$ (.0208) | $\chi^2$ (.0259) | |
| Years of Teaching Experience | | | $\chi^2$ (<.0001) $F$ (<.0001) |
| Level of Education | | | $\chi^2$ (.0010) $t$ (.0269) |
| Degree Major | | | $\chi^2$ (.0463) |
| Certificate Type | | | $\chi^2$ (<.0001) $t$ (<.0001) |
| Title 1 Status | | | $\chi^2$ (.0001) $t$ (<.0001) |

*Note. N = 245.*

The results from this research indicated that teachers chose to engage in a variety of professional development activities. They actively sought out opportunities to improve their practices as educators not only through self-directed learning efforts but also through dialogue and collaboration with their peers. For sites where mentoring was encouraged, both new and veteran teachers joined efforts to improve professional practice. Although this study focused on the professional learning habits of mathematics teachers, the results support findings from other research on teacher professional development. The consensus from this and other studies is that teachers are active self-directed learners who seek a variety of activities to improve their practice as

educators (Akiba, 2012; Birman et al., 2009; Smaller et al., 2000, 2001; Smith & Desimone, 2003; Strizek et al., 2014).

## Discussion

By understanding how teachers choose to learn, federal and state agencies as well as district administration can better plan and support the development of teachers. Currently, much of the federal funding provided by the U.S. Department of Education is directed towards formal activities such as in-service workshops. Formal in-service development is valuable in providing training on timely curriculum initiatives as well as fundamental curriculum and instructional content; however, findings from this study support the idea of federal funding reallocations to support more specific site-based and individual learning opportunities. By providing direct funding and programmatic support to these initiatives, districts can ensure their professional development offerings address the unique needs of their teacher and student populations.

In addition to funding reallocation, support for individual learning could also be encouraged by modifying the parameters for licensing renewal. Many states have continuing education licensure requirements that must be met in order to renew a teaching certificate.  Most states will only recognize district-sponsored workshops or university/college credits. Creating a system that awards credit for self-directed learning activities would not only validate this method of professional development but would also encourage districts to take an active role in the oversight of these activities to ensure that learning and professional development activities are occurring effectively and frequently.

Individual self-directed learning proved to be the most common activity in this study. The participants' decision to impart so much of their personal time on these activities implies that they are looking for ways to deal with the unique challenges that occur within their individual school sites. Reliance on communication with peers and individual learning activities reinforces the need for professional development to be facilitated at the school level. Larger districts are often comprised of diverse school populations. The unique needs of their teachers and students may not be able to be addressed by traditional in-service training. Development of site-based programming enables teachers to determine the content and structure their learning so that it addresses their most critical learning needs.

Changing the environment in which professional development occurs also opens up opportunities for the K-12 community to partner with nonprofit education organizations and local universities and colleges. In the districts that were studied, there were no formal support systems to sustain informal learning. Nonprofit education organizations may be able to fill this gap by developing programs, both face-to-face and online, that facilitate and encourage individual and collaborative learning among teachers. These solutions could be particularly valuable to smaller districts or those that lack sufficient administrative staff to support these endeavors.

Finally, with the recent push of the *Common Core State Standards* and the call for more integration of STEM initiatives in the classroom, education communities can now leverage a broader platform of ideas to acquire outside funding in support of

teacher professional development. The results of this study indicate that teachers choose to learn in a variety of contexts. Whether securing financial support from crowdfunding proposals or through more formal channels like grant-awarding institutions, districts and schools can break the traditional model of professional development and begin experimenting with other modes of learning. Just as teachers are continually challenged to find different, more engaging ways to teach their students, the education community also needs to become more inventive in funding and supporting a variety of development opportunities for teachers.

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# THE USE OF A SELF-EFFICACY IN AUTONOMOUS LEARNING TREATMENT IN AN ONLINE DOCTORAL STATISTICS COURSE: A PILOT STUDY

## David L. Ginnings and Michael K. Ponton

A quantitative true experimental pretest posttest control group design was used to determine whether a treatment given during an online doctoral statistics course could increase an online learner's self-efficacy in autonomous learning as well as the effect of the treatment on academic achievement. The Appraisal of Learner Autonomy (ALA) was used to measure self-efficacy in autonomous learning (pretest and posttest); an objective final examination was used to measure statistical knowledge and skills (posttest only). The students in the experimental group were provided a treatment to increase their perceived sense of capability in autonomous learning. The ALA pretests, posttests, and final exam scores were compared between groups after the treatment. Results of the pilot study suggest an increase in self-efficacy in autonomous learning and better performance on the final exam by the treatment group.

**Keywords:** self-efficacy, learner autonomy, autonomous learning, self-regulation, online learning, adult learning

As technology becomes increasingly grafted into the fabric of higher education, a greater expectation of autonomous learning has accompanied the transition. The distance inherent in online and blended learning environments places a greater responsibility for learning upon the learner (Moore, 2013). Many students fail to realize academic goals in these environments not because of a lack of academic abilities but instead because of a failure to execute certain self-regulatory skills necessary for success in high autonomy environments (Lynch & Dembo, 2004). A significant body of research indicates that self-efficacy mediates many of these self-regulatory processes (Bandura, 1997). It has been argued that the construct of self-efficacy mediates all forms of cognitive motivation, including a person's beliefs or expectations about his or her capacity to accomplish a task or demonstrate a specific behavior (Ponton, Derrick, Hall, Rhea, & Carr, 2005). Logically, it was hypothesized that one's perceived self-efficacy in autonomous learning should precede the conative manifestations of autonomous learning (Ponton et al., 2005).

The construct of autonomous learning identifies a specific subset of cognitive activities (i.e., resourcefulness, persistence, desire, and initiative) that can be especially

valuable in self-directed learning tasks. If a goal is to develop autonomous learners, a "research-based understanding" of the role of self-efficacy within the construct of autonomous learning is "essential" (Ponton et al., 2005, p. 58). The purpose of this study was to determine whether a treatment can increase an online learner's self-efficacy in autonomous learning and to observe the effect of the treatment on academic achievement.

## Problem Statement

There is a vast untapped resource of intelligence and curiosity within people who desire to learn and contribute but are stifled by their own beliefs about their ability to learn. Many learners fail to realize their academic potential in part due to low levels of perceived self-efficacy toward the academic task. Research that directly evaluates the impact of enhancing perceived self-efficacy in autonomous learning on academic achievement is nonexistent (cf. Ponton et al., 2005; Ponton, Carr, Schuette, & Confesssore, 2010). The most effective human functioning occurs when competence and the self-efficacy to employ the skills are present (Bandura, 1997).

## Purpose

The purpose of this study was to determine whether a treatment can increase an online learner's self-efficacy in autonomous learning and to observe the effect of the treatment on academic achievement.

## Literature Review

### Self-Efficacy

Self-efficacy encompasses the ability to organize "cognitive, social, emotional, and behavioral subskills" in order to serve various purposes (Bandura, 1997, p. 37). According to self-efficacy theory, people's perceptions of their personal efficacy partially determine what they choose to do, how much effort they will invest, and whether tasks are approached with confidence or anxiety (Bandura, 1982). If people believe they lack the capabilities to produce desired results, they will be less likely to attempt the action (Bandura, 1997). Peoples' efficacy appraisals within and between varying domains of activity influence aspirations, courses of action, levels of anxiety, perseverance, resilience in the face of adversity, self-hindering or self-aiding thought patterns, coping with environmental demands, and level of accomplishments (Bandura, 1982, 1997). According to research originating from this theory, those who doubt their abilities in a particular domain of activity avoid challenging tasks, have difficulty motivating themselves, give up quicker when faced with obstacles, have weaker commitments to goals they choose to pursue in those domains, and dwell on personal deficiencies and adverse consequences of failure (Bandura, 1997).

   Self-efficacy theory acknowledges the diversity of domains in which human capabilities are manifest. An efficacy belief is not an "omnibus trait" that can be

generalized to all realms of functioning; rather, it is a self-belief in a distinct domain of functioning (Bandura, 1997, p. 36). For instance, one may have a strong perceived self-efficacy in completing a leadership course and a weak perceived self-efficacy (i.e., inefficacy) in completing a statistics course. People who have weak sense of efficacy in a particular domain are likely to avoid challenges within that domain (Bandura, 1997). On the other hand, people with strong beliefs in their capabilities approach difficult tasks as "challenges to be mastered rather than as threats to be avoided" (Bandura, 1997, p. 39). This type of affirmative orientation fosters greater motivation toward activities, stronger commitment to goals, and heightened effort in the face of obstacles (Bandura, 1997). Those with stronger beliefs of efficacy also have a greater likelihood of remaining task-focused and thinking strategically in the midst of difficulties as well as recovering their sense of efficacy after setbacks (Bandura, 1997). This outlook "enhances performance accomplishments, reduces stress, and lowers vulnerability to depression" (Bandura, 1997, p. 39).

During the self-appraisal of efficacy, there are many sources of information that are weighed through self-referent thought or self-reflection (Bandura, 1997). According to Bandura (1997), the four principal sources of efficacy information are (a) enactive mastery experiences, (b) vicarious experiences, (c) verbal persuasion, and (d) physical or affective arousals. From a personal reflection on these sources of efficacy information, people form beliefs about their level of capability and then develop attitudes toward engagement that influence activity choice (Ponton et al., 2005, p. 52).

**Enactive mastery experiences.** Enactive mastery experiences (i.e., experiences of mastery) are the most authentic sources of efficacy information (Bandura, 1997). Developing self-efficacy through mastery experiences is not a mechanistic process (Bandura, 1997). Growing a sense of self-efficacy through mastery experiences involves the integration of "cognitive, behavioral, and self-regulatory tools for creating and executing effective courses of action to manage ever-changing life circumstances" (Bandura, 1997, p. 80). The impact of performance on efficacy beliefs depends upon how personal and situational contributors are interpreted and weighed (Bandura, 1997). Performance successes generally strengthen efficacy beliefs whereas repeated failures often weaken them (Bandura, 1997). Efficacy beliefs are particularly likely to be weakened by failures if the failures occur before a sense of personal efficacy is firmly established and if the failures do not reflect a perceived lack of effort or adverse external circumstances (Bandura, 1997).

Successes do not always strengthen efficacy beliefs, and failures do not always weaken efficacy beliefs (Bandura, 1997). Changes in self-efficacy are the product of cognitive interpretations regarding performances rather than objective evaluations of performances (Bandura, 1997). Factors that affect alterations in perceived efficacy through performance include preconceptions of capabilities, the perceived difficulty of the task, the amount of effort expended, the amount of external aid received, circumstances under which the performance occurred, the temporal pattern of a person's successes and failures, and the ways "experiences are cognitively organized and reconstructed" (Bandura, 1997, p. 81). Preexisting efficacy beliefs are strengthened by further evidence of personal efficacy and by interpreting ambiguous efficacy

information in "self-confirming ways" (Bandura, 1997, p. 82). When people have only experienced successes they interpret as easy, they are likely to expect immediate results and are quickly discouraged by failure (Bandura, 1994). On the other hand, a "resilient sense of efficacy" is built from experience in "overcoming obstacles through perseverant effort" (Bandura, 1994, p. 3). Once people believe they can succeed, they are more likely to persevere in the face of challenges and quickly recover from setbacks (Bandura, 1994). After persevering through adversity, people emerge stronger and more able both actually and perceptually (Bandura, 1997).

**Vicarious experiences**. Efficacy appraisals are also partly mediated by vicarious experiences and allied types of social influences such as modeling (Bandura, 1997). People appraise their capabilities in relation to the attainments of others who are perceived as similar. Seeing people who are similar to oneself perform successfully typically strengthens efficacy beliefs (Bandura, 1997). On the other hand, observing others perceived to be similar fail despite high effort lowers the observers' judgments of their own capabilities (Brown & Inouye, 1978). Models perceived by the observer to be the most similar to the observer offer the most persuasive experiences (Bandura, 1997). Modeling academic skills conveys effective coping strategies, which can boost the self-efficacy of individuals who have had many experiences confirming their personal inefficacy (Bandura, 1977). Even the efficacy beliefs of those who are self-assured can be raised if models teach them better ways of doing things (Bandura, 1997). Modeling influences that convince people of their efficacy lessen the negative impact of failure experiences and engenders effort that supports performance in the face of repeated failure (Bandura, 1997; Brown & Inouye, 1978).

Modeled performances designed to develop coping behaviors should emphasize predictability and controllability (Bandura, 1997). When modeling controllability, the model demonstrates widely applicable strategies for handling various kinds of anticipated threats (Bandura, 1997). The adoption of strategies and reframing of task difficulty will change beliefs in one's capabilities (Bandura, 1997). The greater one's competency in the skills necessary for complex performances, the easier it is to integrate modeled information to produce new behavior patterns (Bandura, 1997). When there are deficits in subskills required for complex performances, subskills can first be developed through modeling and instructional guidance (Bandura, 1997). As development slows or other feedback is not available, people look to comparable norms to assess their abilities (Bandura, 1997). People make "evaluative reactions" and attempt to align personal behaviors with selected observed behaviors (Bandura, 1997, p. 90). When skills are more advanced, people are also more likely to evaluate themselves based on the perceived accomplishments of others (Bandura, 1997). Modeling influences can be structured in ways that instill personal efficacy and avoid the adverse cost of social comparison by "maximizing the modeling's instructive function and minimizing its comparative evaluative function" (Bandura, 1997, p. 92).

People consumed by self-doubt need to first be persuaded of their ability to learn in order to receive the most from information conveyed by models (Bandura, 1997). Coping modeling in which individuals perceived as similar demonstrate progress through perseverance can strengthen a sense of learning efficacy that may be

inaccessible to master models (Bandura, 1997). However, master models who "demonstrate valuable skills in explicit, easily mastered steps" can also raise learning efficacy in "self-doubters" (Bandura, 1997, p. 100).

**Verbal persuasion**. Verbal persuasion is another means for strengthening people's beliefs that they possess the capability to achieve what they seek. People who have been persuaded that they possess the capabilities to accomplish tasks are likely to "mobilize greater effort" and persevere during adversity (Bandura, 1997, p. 101). Shea and Bidjerano (2010) conjectured, "effective teaching presence and positive social presence should serve as sources of social persuasion and positive affect supportive of self-efficacy" (p. 1724). Using verbal persuasion to maintain a supportive and encouraging learning environment will "enhance and facilitate learning" (Derrick, Ponton, & Carr, 2005, p. 8).

Altering a weak sense of efficacy requires "explicit, compelling feedback that forcefully disputes the preexisting disbelief in one's capabilities" (Bandura, 1997, p. 82). Feedback from experiences that are incongruent with one's established self-beliefs are often "minimized or forgotten in reconstructed memory" (Bandura, 1997, p. 82). On the other hand, feedback consistent with established self-beliefs are given significance and are more likely to be remembered (Bandura, 1997). Improvements in functioning are more likely to endure if skill development emphasizes the "personal power to produce results through the exercise of the [learned] skills" (Bandura, 1997, p. 81). That is, if learners attribute the success to the new learned skill, efficacy beliefs connected with that skill are more likely to endure.

When an individual is struggling, evaluative feedback is especially effective to sustain a sense of efficacy if that person's "significant others express faith" in his or her capabilities but especially detrimental when those closest to the individual voice doubts (Bandura, 1997, p. 101). Those who are convinced that they "lack capabilities" are likely to avoid the types of challenges that "cultivate competencies" and are quick to give up (Bandura, 1997, p. 104). By limiting activity choices, undermining motivation, and discouraging exploration, weak beliefs of personal efficacy fabricate their own behavioral validation (Bandura, 1997).

**Physiological and affective arousals.** When assessing their capabilities, people depend partially upon "somatic information conveyed by physiological and emotional states" (Bandura, 1997, p. 106). Somatic perceptions of self-efficacy are especially germane when considering functions involving "physical accomplishments, health functioning, and coping with stressors" (Bandura, 1997, p. 106). People often misinterpret physiological states aroused from performances as signs of "vulnerability or dysfunction" instead of as a natural response to a novel experience (Bandura, 1997, p. 106). Treatments that bridle physiological reactions to "subjective threats heighten beliefs in coping efficacy and lead to corresponding improvements in performance" (Bandura, 1997, p. 106).

Existing self-efficacy beliefs produce biases in the "processing of somatic information" (Bandura, 1997, p. 109). Somatic information is processed as percepts (Bandura, 1997). The percepts operate as an "information base" for making judgments

(Bandura, 1997, p. 110). People accustomed to interpreting somatic arousal as a sign of incompetence are "more likely to lower their perceived efficacy" compared to those who interpret arousal as a natural reaction experienced even by the most competent people (Bandura, 1997, p. 109). A weak belief of self-efficacy increases the likelihood of increased sensitivity to arousal in areas that people feel inefficacious (Bandura, 1997). This can result in a cycle of impaired performance, further undermining efficacy beliefs. In contrast, interpreting arousal as a challenge can boost perceived self-efficacy (Bandura, 1997).

According to Bandura (1997), those who do not believe in their ability to manage academic tasks are "especially vulnerable to achievement anxiety" (p. 235). An assessment of personal efficacy is strengthened by "selective recall of past successes" and weakened by selectively drawing upon failures (Bandura, 1997, p. 111). Anxiety is best assuaged by "building a strong sense of efficacy through the development of cognitive capabilities and generalizable self-regulatory skills" (Bandura, 1997, p. 236) such as the subskills represented in autonomous learning.

## Autonomous Learning

Autonomous learning identifies a specific set of "cognitive activities that are enacted in various degrees during self-directed learning tasks" (Ponton & Rhea, 2006, p. 45). These cognitive activities are related to the constructs of resourcefulness (Carr, 1999), initiative (Ponton, 1999), and persistence (Derrick, 2001). Together, these activities form the core of learner autonomy (Ponton & Rhea, 2006). Over a period from 1997 to 2001, a battery of instruments was developed and validated to empirically assess each of the core components of learner autonomy (Carr, 1999; Derrick, 2001; Meyer, 2001; Ponton, 1999). Throughout these works, the constructs of resourcefulness, initiative, and persistence were established as conates or behavioral intentions (Confessore & Park, 2004) in the domain of learning with desire as a precursor to conation (Confessore & Park, 2004; Meyer, 2001). Ponton (1999, as cited in Ponton et al., 2005) added "that autonomy, like self-directedness, represents cognitive and affective qualities of the agent while autonomous learning refers to subsequent conative manifestations" (p. 50).

**Initiative in autonomous learning.** Ponton (1999) defined initiative as "a behavioral syndrome consisting of five [co-occurring] behaviors: goal-directedness, action orientation, persistence in overcoming obstacles, active-approach to problem solving, and self-startedness" (p. xv). Goal-directed behavior consists of two distinct parts: establishing goals and working toward accomplishing the goals (Ponton, 1999). Ponton described action orientation as "the behavior of translating intentions *quickly* into actions," persistence as "the behavior of continuing action in spite of the presence of obstacles," and an active approach to problem solving as "the behavior in which a person pursues solutions to the problems interfering with goal accomplishment" (pp. 27-28). According to Ponton, "self-startedness refers to the behavior of motivating oneself to begin, either initially or after a period of inactivity, an intentional behavior"

(p. 28). These behaviors in concert make up the construct of initiative in autonomous learning.

**Resourcefulness in autonomous learning.** Carr (1999) defined resourcefulness as the "gathering of internal and external resources required for a learning endeavor" (p. 10). Carr identified the behaviors associated with learner resourcefulness as "prioritizing learning over other things, making choices in favor of learning when in conflict with other activities, looking to the future benefits of learning undertaken now, and solving problems (planning, evaluating alternatives, and anticipating consequences)" (p. 21). Derrick et al. (2005) characterized the qualities of learner resourcefulness as follows:

> The resourceful learner is able to recognize the anticipated future value of the learning, keep the learning a priority despite other goals or obstacles, postpone activities that may be exciting or fun for the future value of the learning, and solve problems related to the learning endeavor. (p. 6)

These internal and external resources and behaviors characterize resourcefulness in the autonomous learner.

**Persistence in Autonomous Learning.** Derrick (2001) asserted, "persistence in a learning endeavor is the volitional behavior that enables the individual to sustain the effort and perseverance necessary to remain focused on the achievement of a goal, despite obstacles, distractions, and competing goals" (p. 3). The capability to mobilize and sustain perseverant effort is a critical predictor of self-development and necessary to convert potential to behavioral fulfillment (Bandura, 1997). Volition, self-regulation, and goal-directedness are the emblematic behaviors of intentions to persist in autonomous learning (Derrick, 2001).

## Self-Efficacy in Autonomous Learning

Equipping learners with the subskills associated with autonomous learning by enhancing their self-efficacy to execute the behaviors associated with autonomous learning effectively will empower learners with greater control over their academic achievement. The "motivation to engage in any learning event is predicated upon [the] outcomes that one believes to be possible" (Derrick et al., 2005, p. 7). As a learner becomes more fully autonomous, efficacy beliefs are reinforced and enhanced (Derrick et al., 2005, p. 7). Thus, college faculty need to uncover strategies to "enhance efficacy beliefs through autonomous learning events" (Derrick et al., 2005, p. 7). As successes are attributed to the personal exercise of autonomous learning behaviors, the results provide an opportunity for feedback that builds a learner's self-efficacy in autonomous learning (Derrick et al., 2005). As self-efficacy in autonomous learning beliefs become more established, learners choose to engage in more autonomous learning activities (Derrick et al., 2005).

Research that directly evaluates the impact of enhancing perceived self-efficacy in autonomous learning on academic achievement is nonexistent (cf. Ponton et al., 2005, 2010). This study was designed to provide experimental evidence of a treatment that attempted to increase online learners' self-efficacy in autonomous learning during an online doctoral course that required a great deal of learner autonomy for success (i.e., the course incorporated primarily self-guided activities with the instructor available to respond to student-generated questions). Thus, we hypothesized that a strengthening of self-efficacy in autonomous learning would lead to greater academic achievement in the course subject matter.

## Method

### Participants

Participants in the study were delimited to doctoral education students attending Regent University and taking the online program requirement *Educational Statistics* (EFND 722) in a given semester. Students who enrolled in EFND 722 sections 1 and 2 prior to the course opening in Blackboard were randomly assigned to either an experimental or control group. Of the 41 students who were in the experimentally accessible population, 22 volunteered to participate in the study (10 in the experimental group and 12 in the control group). The experimental group's average GRE quantitative reasoning score was slightly higher ($M = 143.9$) than the control group's ($M = 143.7$).

### Instrumentation

An efficacy belief is not an "omnibus trait;" rather, it is a self-belief in a distinct domain of functioning (Bandura, 1997, p. 36). Because self-efficacy is contextual (Bandura, 1997), the Appraisal of Learner Autonomy (ALA; Ponton et al., 2005) was used to measure self-efficacy in autonomous learning. The second instrument, the final exam, was an objective measure of topics covered in the course.

### Procedures

Students in both groups were pretested using the ALA. The students in the experimental group were provided a treatment to increase their perceived sense of self-efficacy in autonomous learning. After the treatment, students in both groups were given the ALA as a posttest. The ALA pretest/posttest and final exam scores were compared between groups after the treatment.

### Treatment

The treatment consisted of three parts: a video, a discussion, and an email. Each of the three parts of the treatment were drawn from Bandura's (1997) sources of efficacy information and attempted to enhance a learners' self-efficacy in autonomous learning.

**Video (vicarious learning).** Students in the experimental group were emailed their own unique link to a video that briefly described strategies associated with the construct of autonomous learning within the context of this particular learning endeavor (i.e., the lead author focused on his experience as a doctoral student at this same university taking this same course). In the video we made an intentional effort to emphasize the lead author's similarity to the students. Since the message was modeled by an individual assumed to be perceived as similar to the students, the hypothesis was that the video had a vicarious impact on the learners' beliefs in their ability to exercise desirable autonomous learning behaviors. The videos were the same for all students in the experimental group except for a slide at the end of the video that contained a different number. Because each student had his or her own video link, we were able to generate analytics from YouTube on the number of times the participant viewed the video as well as the duration of the viewing.

Table 1. *Participant Exposure to the Video*

| Participant # | Number of views | Watch time in minutes for all views |
| --- | --- | --- |
| 1 | 2 | 9.27 |
| 2 | 2 | .52 |
| 3 | 1 | 1.23 |
| 4 | 2 | 10.97 |
| 5 | 2 | 10.52 |
| 6 | 2 | 8.48 |
| 7 | 2 | 7.63 |
| 8 | 1 | 1.27 |
| 9 | 1 | 1.73 |
| 10 | 1 | 2.27 |

*Note.* The video was 9 minutes and 57 seconds in length.

**Discussion forum (enactive mastery experiences).** After the lead author explained his strategies for autonomous learning via the video, the students in the experimental group were asked to identify times during the course when they were able to learn autonomously despite the presence of obstacles. The posts were contributed to an ungraded discussion forum. The discussion posts were visible to students in the experimental group. By reflecting upon these mastery experiences students may cognitively select and weigh autonomous learning experiences that may not have otherwise received attribution for academic achievement.

**Email (verbal persuasion and physical arousal).** The students were assigned a quiz over the course materials from the forth unit. After learners completed the quiz prior to the final exam, an email was sent out to the students in the experimental group. The content of the email was the same for each student in the experimental group. The email had three goals: (a) to help students who may have experienced a negative

emotional arousal to their performance frame the reaction as a natural response to a novel experience that will fade as competence increases, (b) to help students attribute success to autonomous learning behaviors, and (c) to help students frame successes as mastery experiences in autonomous learning.

## Findings

According to Cumming (2013), if difference is the effect of interest, confidence intervals are most appropriate for interpretation. Furthermore, the American Psychological Association (2010) stated, "whenever possible, base discussion and interpretation of results on point and interval estimates" (p. 34). Therefore, the approach used to interpret the findings was to focus on group differences between the experimental and control groups in light of the descriptive statistics and confidence intervals. Descriptively the experimental group had a greater increase in ALA scores from pretest to posttest. The experimental group had a sample mean increase of 5.79 points and a *SD* decrease of 6.52 points. The control group had a sample mean increase of 3.56 points and a *SD* increase of 1.52 points.

Table 2. *Descriptive Statistics* ($N = 22$)

|              | Groups       | *M*   | *SD*  | *n* |
|--------------|--------------|-------|-------|-----|
| ALA pretest  | Experimental | 51.54 | 18.44 | 10  |
|              | Control      | 61.35 | 13.92 | 12  |
|              | Total        | 56.89 | 16.49 | 22  |
|              |              |       |       |     |
| ALA posttest | Experimental | 57.33 | 11.92 | 10  |
|              | Control      | 64.91 | 15.44 | 12  |
|              | Total        | 61.46 | 14.16 | 22  |
|              |              |       |       |     |
| Final exam   | Experimental | 81.65 | 14.59 | 10  |
|              | Control      | 75.48 | 15.77 | 12  |
|              | Total        | 78.28 | 15.21 | 22  |

*Note.* The maximum possible score on the ALA and the final exam are 100.

The confidence intervals for the experimental group on the ALA pretest was 95% CI = [38.36, 64.73] and on the posttest 95% CI = [48.80, 65.86], which indicated a 10.44-point increase on the lower bound. The control group ALA pretest was 95% CI = [52.50, 70.20] and ALA posttest 95% CI = [55.10, 74.71], which was a 3.4-point increase on the lower bound. These results suggest a greater increase in self-efficacy in autonomous learning for the experimental group especially among the lower bound of this group.

Table 3. *95% Confidence Intervals for Mean*

|  | Experimental (*n* =10) | Control (*n* = 12) | NP in S1 (*n* = 10) | NP in S2 (*n* = 9) |
|---|---|---|---|---|
| ALA pretest |  |  |  |  |
| Lower bound | 38.36 | 52.50 | - |  |
| Upper bound | 64.73 | 70.20 | - |  |
|  |  |  |  |  |
| ALA posttest |  |  |  |  |
| Lower bound | 48.80 | 55.09 | - |  |
| Upper bound | 65.86 | 74.71 | - |  |
|  |  |  |  |  |
| Final exam scores |  |  |  |  |
| Lower bound | 71.22 | 65.45 | 60.68 | 64.43 |
| Upper bound | 92.09 | 85.50 | 83.76 | 84.94 |

*Note*. NP = students taking the course but not participating in the experiment. S1 = Section 1 (contained the experimental group), and S2 = Section 2 (contained the control group).


The descriptive statistics also reveal higher final exam scores for the experimental group (*M* = 81.65, *SD* = 4.61, *n* = 10) as compared to the control group (*M* = 75.48, *SD* = 4.55, *n* = 12). The confidence intervals for the experimental group on the final exam were 95% CI = [71.22, 92.10] and for the control group 95% CI = [65.45, 85.50]. The experimental group confidence intervals had a higher lower bound and a higher upper bound than the control group. The descriptive statistics indicated that the experimental group performed better on the final exam not only relative to the control group but also relative to the other students in the same section who did not experience the treatment. Based upon these results, it appears that the treatment may have had a positive effect on final exam scores.

## Discussion

**Self-Efficacy Improvement**

This experiment indicated that online doctoral students' sense of perceived self-efficacy in autonomous learning can be strengthened during an online course through a self-efficacy in autonomous learning treatment. Self-efficacy development is essential for maximizing human potential as perceptions of personal efficacy partially determine what people choose to do, how much effort they will invest, and whether tasks are approached with confidence or anxiety (Bandura, 1982). These findings suggest that students with a weaker sense of self-efficacy experienced the greatest increases in perceived self-efficacy from the treatment. The students relieved of their self-doubts likely employed different learning strategies, exerted greater effort, and had more effective use of skills. Facilitators should look for opportunities to persuade learners of

their capabilities based upon authentic appraisals current abilities and reasonable increases, vicarious influences, and by helping learners interpret their physiological or affective arousal. Learners must understand that discomfort is a natural response to novel experiences; thus, facilitators should guide learners in interpreting these arousals in efficacy-building ways. Based on the notions that a healthy sense of self-efficacy toward a task improves performance and changes in self-efficacy are the product of interpretations of performances, facilitators of learning can influence students' future performances via the presentation of feedback and design of courses.

### Final Exam Scores

Based on the random assignment of groups and the quantitative GRE scores one would expect the final exam scores to be fairly equivalent between groups. However, they were not: the treatment group performed better on the final exam. Therefore, we suggest the treatment may have had a positive influence on final exam scores. An unexpected phenomenon realized in this study was that, even when including the increase in self-efficacy, the experimental group had a lower perceived self-efficacy in autonomous learning in the posttest. With the understanding that self-efficacy is a changeable domain specific subjective personal evaluation of competency, the treatment may have influenced more than students' self-efficacy in autonomous learning. Although speculative, students in the experimental group may have experienced a change in their self-efficacy to succeed in this particular learning endeavor (separate from their self-efficacy in autonomous learning) resulting in more effective use of their knowledge and skills. This could have occurred through the vicarious influence of the video and the announcement that offered a healthy framing of physiological arousal within the context of learning statistics. Self-regulatory and academic skills are so interwoven that it is difficult to isolate efficacy development among disparate domains without appropriate measurements.

### Limitations

Participants were randomly assigned to the experimental and control groups but not randomly selected from the entire population of doctoral education students; thus, generalizing the findings to other students, programs, and institutions should be done cautiously. The greatest limitation of this study was the small sample size. There were 41 students in the experimentally accessible population, and 22 participated in the study. This resulted in 10 students in the experimental group and 12 in the control group; thus, the design was slightly unbalanced in addition to being small. Another noteworthy difference between groups was a difference between ALA Pretest scores. The control group entered the experiment with higher ALA scores ($M = 61.35$, $SD = 13.92$, $n = 12$) than the experimental group ($M = 51.54$, $SD = 18.44$, $n = 10$). A second limitation was that students in the experimental group engaged the treatment to different degrees (e.g., some watched the video multiple times while others watched only a portion of it once). Furthermore, participation in the optional discussion forum was minimal. Future replications of this study should consider incentives for

participation in the treatment. Assuming a larger sample, future replications of this experiment should also consider comparing groups (within the experimental group) based on engagement of the treatment. Considering the small sample, this experiment has been framed as a pilot study with recommendations for a future larger study.

## Implications for Future Research

It would be valuable to observe changes in academic achievement throughout the course of particular students who experienced the greatest changes in self-efficacy of autonomous learning and look for changes in academic achievement. Furthermore, dividing students into groups based on their engagement of the treatment (e.g., the group of students who watched most of the video could be compared to those who did not) may help clarify the impact of parts of the treatment. Additional empirical clarity concerning the processes that lead to manifestations of autonomous learning can guide future facilitators of learning to maximize human potential.

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