International Journal of Self-Directed Learning®

Volume 7, Number 1
Spring 2010

The *International Journal of Self-Directed Learning* (ISSN 1934-3701) is published biannually by the International Society for Self-Directed Learning. It is a refereed, electronic journal founded to disseminate scholarly papers that document research, theory, or innovative or exemplary practice in self-directed learning. Submission guidelines can be found at http://www.sdlglobal.com.

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Cover design by Gabrielle Consulting

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Volume 7, Number 1, Spring 2010

Preface

This issue contains two articles that examine aspects of self-directed and autonomous learning from cross-cultural viewpoints and two articles on self-directed learning in the United States, but with broad implications. The first article by Siew Foen Ng and Gary J. Confessore extends the research on learning styles and learner autonomy. They used the *Leaner Autonomy Profile* and the *Grasha-Riechmann Student Learning Styles Scales* with a sample of learners in Malaysia. For this group of learners, the number of learning styles that can be utilized enhanced the *Learner Autonomy Profile* scores for individuals. Their data provides more support for matching teaching strategies with students' learning styles.

C. Amelia Davis, Carrie Bailey, Mary Nypaver, Tracy Rees, and Ralph G. Brockett extend our understanding of Allen Tough's original research on learning projects in the next article. By adding technology related questions to Tough's initial interview schedule, the research team interviewed 40 graduate students. Interestingly, they found that these students engaged in a variety of learning projects both within and outside of their academic studies. Although the percentage of self-planned projects was lower than in previous studies, more than 40% of all projects were cited as having computer technology as a major support for their learning.

The third article, by Gregory M. Francom, entitled *Teach Me How to Learn*, offers a thorough review of the literature in both self-directed learning and self-regulated learning. His efforts help to draw the two parallel areas of research closer together. He derives four useful principles for fostering self-directed learning skills. From his work he stresses the importance of centering learning on learning tasks to enhance success.

In the final article, Albertina L. Oliveira, José Tomás Silva, Lucy M. Guglielmino, and Paul J. Guglielmino look at self-directed learning readiness in Portugal to provide another cross-cultural perspective. They examined the readiness of managers and non-managers of top companies in Portugal. Some important cultural differences were discovered as they extend the knowledge about self-directed learning readiness. As Portugal is currently making new efforts to improve the quality of their educational efforts, self-directed learning has great potential for enhancing a learning culture.

Roger Hiemstra, Co-Editor

A special note: The *IJSDL* will now be accepting articles written only using the 6th edition of the American Psychological Association's Publication Manual. Published in 2010, this edition contains some useful but important differences. Check the website for more information: http://www.sdlglobal.com.

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CONTENTS

THE RELATIONSHIP OF MULTIPLE LEARNING STYLES TO LEVELS OF LEARNER AUTONOMY

Siew Foen Ng and Gary J. Confessore

The literature points to the need for learners who are autonomous and self-regulating. However, in both formal and informal environments different learning tasks often call for different learning styles that are inherent in the episode itself. Hence, learners who are comfortable engaging in a variety of learning styles may be more successful in a broader range of settings than those with a narrower comfort range. This study examined the relationship of learning styles to learner autonomy in order to gain an understanding of how these two variables are related to each other. The *Learner Autonomy Profile* and *Grasha-Riechmann Student Learning Styles Scales* were distributed to learners from a range of academic departments in public and private universities in Malaysia. A stratified structured sample of 249 responses was analyzed in this study. The results showed a significant positive relationship pertaining to the number of preferred learning styles and learner autonomy profile scores.

INTRODUCTION

Learners come from a variety of backgrounds and have diverse characteristics and needs which may influence their learner autonomy or behavioral intentions to participate in learning. Learners' behavioral intentions or capacity to learn are related to their demographic characteristics, learning environment perceptions, learning styles, prior experience and other factors (Carr, 1999; Derrick, 2001; Meyer, 2001; Ng, 2009; Ng & Confessore, 2010; Park, 1998; Ponton, 1999). According to Confessore and Confessore (1994), autonomous learning manifests in individuals who feel the need to learn. Such people also utilize both internal psycho-social resources and external human and material resources to enhance their efforts.

Research by Felder (1996), Oladoke (2006), and Robotham (1995) indicates that highly self-directed or autonomous learners have the ability to utilize skills from all learning styles as they effectively process information. Based on this, it appears that the number of learning styles with which individuals are comfortable is essential information in estimating the extent to which they are likely to function as relatively autonomous learners. For instance, an individual who prefers an independent learning style will work fine when being assigned to work alone. However, if a collaborative project is given, will the independent learner be inclined to participate as a team member? Learners who possess both independent and collaborative learning styles are less likely to face preference problems of completing both kinds of tasks. The same goes for other circumstances which may require

learners to employ different learning styles in different situations. This means the more learning styles individuals are comfortable using, the more likely they will effectively and efficiently implement them in learning situations. Thus, it is essential to understand relationships between autonomy and learning styles to determine if individuals' comfort with more learning styles is associated with their increased autonomy in learning. An improved understanding of learning styles in relation to learner autonomy would add to the knowledge base of the field and may lead to improved practice in both formal and informal learning settings.

RELATED LITERATURE

Long (1990) has pointed out that self-directed learners are autonomous, as well as flexible and adaptive. Long's idea is an important link to this study since it provides a strong theoretical underpinning leading the authors to speculate that learners who are autonomous can be found across all the learning styles. Kolb (1984) proposed in his theory of growth and development a relationship between learning styles and self-directedness. In a study using Kolb's *Adaptive Style Inventory*, he indicates that there is a relationship between self-directed learning and four of the learning styles. He further suggests that a high degree of self-directness may not fall distinctly within any one learning style. Instead, he asserts it is more closely related to all the learning styles. This is consistent with self-directed learning theory that highly values flexibility and adaptability which was further asserted by Long's (1990) description of a self-directed learner.

Felder (1996), Kolb (1984), Robotham (1995), and others have indicated that there appears to be a link between self-directed learning and learning styles, although there is no general consensus on the exact nature of that link. Adenuga (1991), Canipe (2001), Kolb (1984), and Ware (2003) reported that self-directedness is associated with some of the learning styles. Others, including Felder (1996), Oladoke (2006), and Robotham (1995), support the idea that learner self-directedness embodies flexibility and adaptability, thereby augmenting the claim that highly self-directed or autonomous learners tend to be able to utilize skills from all the learning styles as they effectively process information.

Since this is a study of distance learners in Malaysia, it is important to note that some researchers differentiate preferred learning styles among Chinese, Indian, and Malay subjects as representatives of three major ethnic groups within the general population of that nation (Barron & Arcodia, 2002; Syed Jamal Abdul Nasir, 2006). This is consistent with the assertions of researchers in other countries who have concluded that ethnic minorities often exhibit learning style preferences that differ from those of the ethnic majority (Bennett, 1986; Dunn, 1997; Irvine & York, 1995). Currently, the ethnic distribution of the Malaysian population is 53.3% Malay, 26.0% Chinese, 7.7% Indian, and 13.0% other (U.S Department of State, 2010).

METHODOLOGY

Hypotheses

Two research hypotheses were explored in this study:

1. There is a significant and positive correlation of the total score of the LAP-SF and the various learning style scores of the GRSLSS of distance learners in Malaysia.

> Restated in the null form it is as follows: The total scores of the LAP-SF do not correlate significantly with the various learning style scores of the GRSLSS of distance learners in Malaysia.

2. The number of GRSLSS learning styles for which distance learners in Malaysia express a moderate to high preference correlates significantly and positively with the total scores of the LAP-SF.

> Restated in the null form, that hypothesis is as follows: The number of GRSLSS learning styles for which distance learners in Malaysia express a moderate to high preference do not correlate significantly with the total score of the LAP-SF.

Instrumentation

Learner Autonomy Profile-Short Form (LAP-SF)
The Learner Autonomy Profile, V3.0 (LAP) is a battery of four instruments developed to assess the underlying components of Confessore's (1991) *Desire, Initiative*, *Persistence*, and *Resourcefulness* behavioral intentions model. The *Desire* construct assesses Change Skills, Circumstance, Communications Skills, Expression, Group Identity, Growth and Balance, and Love Issues as precursors to the development of intentionality (Meyer, 2001). The remaining constructs assess behavioral intentions contextualized to learning. For example, *Initiative* assesses Action Orientation, Active Approach, Goal-Directedness, Overcoming Obstacles, and Self-Starting (Ponton, 1999); *Persistence* assesses Goal-Maintenance, Self-Regulation, and Volition (Derrick, 2001); and *Resourcefulness* assesses Anticipating Consequences, Deferring Gratification, Evaluating Alternatives, Future Orientation, Learning Priority, Planning, and Resolving Conflict (Carr, 1999).

Confessore and Park (2004) conducted a factor validation of the LAP and reported standardized Cronbach's Alphas of .9397 for *Desire*, .9659 for *Initiative*, .9711 for *Persistence*, and .9685 for *Resourcefulness*. They then utilized step-wise regression to extract the 66-item LAP-SF. Cronbach's Alphas for the LAP-SF ranged from .8992 to .9340 and correlations to the LAP ranged from .82 to .99. The LAP-SF was used to assess students' levels of learner autonomy in the present study.

Grasha-Riechmann Student Learning Styles Scales (GRSLSS)
The Grasha-Riechmann Student Learning Styles Scales (GRSLSS) was selected as the appropriate instrument for examining the learning style preferences of undergraduate

college students within the blended contexts of the socially interactive site-based and distance learning environments. These were the environments utilized by the universities attended by the present study's target population. The GRSLSS has been used to identify preferences that students have for interacting with other students and instructors in various learning environment (Diaz & Cartnal, 1999; Grasha, 2002). Early in the development process, six learning style dimensions were identified to be *Avoidant, Collaborative, Competitive*, *Dependent, Independent,* and *Participant*. These dimensions describe a blend of characteristics that apply to all students. Each student possesses some degree of preference for each of these dimensions. Ideally, a student would have a balance of all six; however, most students tend to favor one or two of the dimensions (Grasha, 2002). Grasha and Riechmann (1974) established a test-retest reliability coefficient for the six dimensions that ranged from .76 to .83 and correlation coefficients between the statements and each of the six dimensions that ranged from .74 and .89.

The GRSLSS six learning styles dimensions broaden the learning style perspective suggested by Kolb (1976) and form preferences according to bipolar measures, such as field-dependence and field-independence, into a perspective of six dimensions. This multidimensional perspective of learning style discourages stereotyping of students and a simplistic assessment of students' learning style preferences (Diaz & Cartnal, 1999). Blended learning environments, such as in the present study, call upon students to learn effectively in site-based and distance contexts. The GRSLSS was preferred to other learning style models because the six dimensions address the issue of interaction, which the authors viewed as essential to the assessment of learning in blended environments.

Translation-Retranslation and Validation of Both Instruments

Although English is the primary language of instruction throughout the educational system of Malaysia, many individuals are more comfortable reading Bahasa Malaysia. In Ng's (2009) study, both instruments were translated from English to Bahasa Malaysia by one team and retranslated into English by a second team. Differences were jointly resolved and the instruments were then distributed to the study participants with each item presented in both languages to assure comprehension.

The Study Sample

The population consisted of both degree and higher diploma students enrolled in blended distance learning programs offered by a range of academic departments. Two hundred and forty-nine completed surveys were collected via stratified structured sampling and used for analyses in this study. The sample consisted of distance learners who self-identified as 189 Malay, 45 as Chinese, 7 as Indian, and 8 as Other.

Data Analyses

Descriptive statistics were used to analyze the data using SPSS 16.0. Scale and ordinal data were treated using independent samples t-tests and Pearson correlations. Nominal data were treated using Chi-square and cross tabulations with Cramer's V.

FINDINGS

Concerns related to influence on learning styles and learner autonomy that may be attributable to diversity among the three primary ethnic groups in Malaysia, as noted in Barron & Arcodia (2002) and Syed Jamal Abdul Nasir (2006), were addressed through Chi-square comparisons for the Malay and Chinese respondents. Due to inadequate representation, Indian and Other were not included in this phase of analysis. The authors felt that the ratio of 189 Malay to 45 Chinese (4.2:1) in the present study was sufficiently large enough to raise concerns about the use of t-test comparisons. Therefore, Chi-square tests were chosen for this phase of analysis (Kraemer & Thiemann, 1987).

In the first step of this analysis, the five LAP-SF scores were ranked and sorted within the high, middle, and low thirds of all scores. Then, the Malay and Chinese participants were selected for Chi-square tests of the LAP-SF and GRSLSS score distributions. In no case was the reported distribution significantly different than expected at the $p < .05$ level and there were no cells with an expected frequency of fewer than five. This indicated that the sample sizes of the Malay and Chinese respondents were adequate to support the analysis conducted. Based upon this outcome, it was decided that the potential differences in LAP-SF and GRSLSS scores were not a concern. Still, it is important to note there is a potential for error caused by comparisons in which one group is four times the size of the other. A future study involving relatively equal samples of Chinese, Indian, and Malay respondents may provide further insights into the potential influences of ethnicity on learner autonomy and learning style preferences relationships.

Correlation analysis of each of the learning styles and LAP-SF scores for the entire sample of 249 respondents, displayed in Table 1, provide an interesting view of their relationship. These correlations reveal that learner autonomy is positively and moderately correlated with all of the learning styles, except *Avoidant*, at the .001 level of significance. This means the higher the learner autonomy, the higher the preference for *Collaborative, Competitive, Dependent, Independent* and *Participant* learning styles. Therefore, the findings of this study support the research hypothesis that there is a significant, positive correlation between the learning styles and learner autonomy scores. The magnitude of the correlations ranged from .327 to .552.

The strongest linear relationship was found between the GRSLSS *Participant* learning style score and LAP-SF score ($r = .552$, $p = .001$). Similarly, the next most positive linear relationship was found between the *Collaborative* learning style score and LAP-SF score ($r = .522$, $p = .001$). In order of relationship in terms of strength these are followed by the *Independent* learning style score and LAP-SF score ($r = .468$, $p = .001$) and last by both *Dependent* learning style score and *Competitive* learning style score which also displayed positive linear relationships with the LAP-SF score ($r = .358$, $p = .001$; $r = .327$, $p = .001$). According to Guildford (1956), as a rule of thumb the r value of .400 to .700 is considered a positive and moderate linear relationship.

Table 1. *Correlation Coefficients of Learning Styles to Learning Autonomy Total Scores*

Learning Styles	*Correlation to Learner Autonomy*	*p-Value*
Independent	.468	.001**
Avoidant	- .096	.130
Collaborative	.522	.001**
Dependent	.358	.001**
Competitive	.327	.001**
Participant	.552	.001**

** Significant at .01 level (2 -tailed)

To assess the correlation between the numbers of learning styles preferred and learner autonomy, cross tabulation analysis was utilized. In order to gauge the number of learning styles preferred by each respondent, based on the learning styles scores categorized as low, moderate, and high, a new variable was created and labeled *Number of Learning Styles* (NLS). A Chi-square test of independence was conducted to assess whether the number of learning styles employed by the learners is related to their level of autonomy. A significant relationship was found between the number of learning styles and level of learner autonomy (Pearson $\chi^2 = 28.841$, DF = 2, $p = .000$). An inspection of Table 2 for patterns of relationships reveals that the majority (67.6%) of the high LAP-SF learners utilized three to six learning styles in their learning, while the majority (71.6%) of the low LAP-SF learners employed less than two learning styles. This suggests that, in general, the higher the learner autonomy, the more learning styles that are being utilized in learning.

Cramer's V value ($V = 0.34$) indicates that the strength or magnitude of relationship between learner autonomy and number of learning styles is at the moderate level. There were no cells with an expected count of less than five, which suggests the analysis conducted was appropriate. This finding supports the second research hypothesis that the number of GRSLSS learning styles for which distance learners in Malaysia express a moderate to high preference correlates significantly and positively with the total scores of the LAP-SF.

Table 2. *Chi Square Test of Independence for Number of Learning Styles (LS) and Level of Learner Autonomy (LAP)*

	Number of Learning Styles (NLS)		
Level of LAP	*0-2 LS*	*3-6 LS*	*n (Respondents)*
Low	083 (71.6%)	033 (28.4%)	116
Moderate	030 (46.2%)	035 (53.8%)	065
High	022 (32.4%)	046 (67.6%)	068
Total	135 (54.2%)	114 (45.8%)	249

Thus, the number of learning styles preferred by the distance learners in Malaysia is correlated positively and moderately with their learner autonomy scores and, as such, to their intentions to participate in learning activities. The *Collaborative*, *Independent*, and *Participant* learning styles correlate positively and moderately to LAP-SF scores. Similarly, the *Competitive* and *Dependent* learning styles are positively correlated to the LAP-SF. The correlation of *Avoidant* learning style and LAP-SF scores is not significant. Grasha (2002) described learners with an *Avoidant* style as not wanting to learn the content, not enjoying learning, and avoiding taking part in course activities. Despite the fact that there was no significant relationship between the *Avoidant* style and the LAP-SF total score in the present study, it would be interesting basis to examine the relationship of this learning style and dysfunctional learner independence, which Confessore and Park (2004) defined as follows:

> Dysfunctional learner autonomy is characterized by an inability or unwillingness to accept guidance or assistance of any type regarding the learning process. In the extreme, this individual does not allow others to participate in shaping any aspect of the learning process. (p. 41)

DISCUSSION

The analysis supports the research hypothesis that there is a significant and positive relationship between the number of learning styles and learner autonomy. Using the Chi-square Test of Independence it was found that highly autonomous learners utilize more learning styles as compared to less autonomous learners. Specifically, strong positive correlations, $p = .001$, were found between the LAP-SF scores and five attributes from the GRSLSS. The one attribute that is not positively correlated is the one that denotes a style of avoiding participation in learning. This means that as learner autonomy scores increase, preferences for the *Collaborative, Competitive, Dependent, Independent,* and *Participant* styles increase. These findings support the findings of Candy (1991), Fitzgerald (2003), and Oladoke (2006).

In Candy's (1991) research it was found that autonomous learners, or those who are self-directed, were often *Collaborative* and *Participant*, yet *Independent*. Similarly, Fitzgerald, investigating the relationship between learning styles and self-directed learning, surmised that the typical self-directed learner is *Collaborative*, *Independent,* and *Participant*, but not *Avoidant, Competitive,* or *Dependent*. The present study is consistent with Fitzgerald but a deeper and more meaningful revelation was found. It was observed that using the LAP-SF to explore the autonomy of learners was more robust, as it was better able to define the characteristics of autonomous learners through their learning styles. The present study found that autonomous learners are linked to five learning styles: *Collaborative, Competitive*, *Dependent, Independent,* and *Participant*. This finding also confirmed Kolb's (1984) theory of growth and development that a relationship exists between learning styles

and self-directedness. He suggested that a high degree of self-directedness may not coincide with any particular learning style, but instead, be linked to all learning styles.

Similarly, Oladoke (2006) found that the learning styles present in distance learners may be directly related to their success in the online learning environment. Using Kolb's (1976) styles inventory, Oladoke discovered that these learners were able to use one or all of the four styles measured to some extent; however, the active reflective style emerged as the predominant preference. This is in line with Felder and Silverman (1988) who found that learners utilize different learning styles as learning situations vary and that it is possible to have learning style preferences that benefit particular learning situations better than others. Oladoke concluded that the ability of distance learners to utilize their preferred learning styles influences their self-directedness.

Confessore and Park (2004) posited that learner autonomy is a behavioral construct and, as such, it is subject to intervention and with facilitation it can be enhanced. Such interventions have the potential to help students develop desirable skills that encourage behavioral changes, which may enable them to make choices that lead to more successful outcomes.

Using the LAP-SF, the present study has indicated that "functionally autonomous learners," (Confessore & Park, 2004, p. 42) are versatile in their approach to learning. They demonstrated *Collaborative, Competitive*, *Independent, Participant,* and, at times, *Dependent* learning styles when pursuing learning. This would indicate, as others have suggested, that successful self-directed learners or autonomous learners are flexible and adaptable (Long, 1990) and are able to choose across learning styles, utilizing the one that best meets the demands of a particular project and or learning situation (Felder, 1996; Robotham, 1995).

One interesting observation that is worth noting here is that the *Dependent* learning style is positively correlated to learner autonomy. This indicates that distance learners who are highly autonomous have a high preference for this learning style. What does this mean? We infer from Confessore and Park's (2004) definition of dysfunctional learner dependence that learners who manifest the *Dependent* learning style, view teachers and peers as sources of structure, support, and specific guidelines that are essential to their learning. In this research, when highly autonomous learners have a preference for this learning style, it indicates that they are indeed flexible in their learning. They are flexible to the extent that they are able to adapt to situations that require them to follow structured programs and be comfortable when they are directed by authority figures.

In distance learning situations, avoidant students often procrastinate and avoid their work, which can lessen their abilities to successfully complete their academic tasks (Wolters, 2003). Hence, when distance learners prefer the *Avoidant* learning style, it could mean they do not have the behavioral intention to participate or are reluctant to participate. According to Lock (2002), when pedagogical approaches encourage students to participate in an effective learning community, students interact with others in the process of sharing

information and negotiating meaning in ways that lead to the construction of knowledge. However, when pedagogical approaches place the instructor at the center of the learning process as "dispensers of knowledge," one unintended consequence is that students adopt an *Avoidant* style of learning that may lead to a lack of participation and irregular course attendance (Howell, 2001). Along the same vein, Grasha (2002) describes *Avoidant* learners as those who are not enthusiastic about learning content and attending class. Consequently, they do not participate with students and teachers in the classroom as they are uninterested or overwhelmed by what goes on in class.

The blended mode of distance programs used in Malaysian universities has both online and face-to-face components to assist students in their learning. Most of the students who are enrolled in distance learning courses in Malaysia are working adults who have been given a second chance to participate in post-secondary learning. In addition, the opportunity to participate in a blend of face-to-face classes and online forums often meets a broad spectrum of learning style preferences of students. As a result, it could be expected that these students are able to appreciate their learning more and be less likely to adopt the *Avoidant* style of learning. However, since the correlation of the *Avoidant* learning style to learner autonomy scores is not significant, avoidant preference may be a reflection of dysfunctional learner independence in formal learning environments but not in other settings. According to Confessore and Park (2004), dysfunctional learner independence "… is characterized by an inability or unwillingness to accept guidance or assistance of any type regarding the learning process. In the extreme, this individual does not allow others to participate in shaping any aspect of the learning process" (p. 42). This could imply that highly autonomous learners may adopt an avoidant learning style as they are comfortable in learning even without participating with students and teachers in the classroom activities.

Results of this study also reflect the importance of being comfortable with a variety of learning styles when approaching learning. This is in line with Hisham's (2004) study on distance learners in Malaysia and their learning styles in which he surmised that individuals will be better learners when they expand their learning preferences. Being versatile in learning preferences enhances one's capacity to participate actively in learning. This means program providers and writers in distance education have to ensure that courses are conducted with different approaches to stimulate the use of different learning styles, as this will encourage learners to participate actively and productively.

In summary, based on the correlations calculated, it can be assumed that a typical autonomous learner is *Collaborative, Independent, and Participant,* yet at times *Competitive* or *Dependent*. The distance learning mode used in all the higher institutions in Malaysia is a blended approach in which learners not only use online learning but have the opportunity to meet their tutors face-to-face. Thus, it is not surprising that the dependent learning style is also preferred by participating distance learners. Based on these results, it might be assumed that the qualities of *Collaborative* and *Independent* are mutually exclusive, or that *Independent* and *Participant* are essentially opposites. However, given

that Grasha (1996) asserts the only true dichotomy in the GRSLSS is between *Avoidant* and *Participant*, such assumptions would seem to be unwarranted.

CONCLUSIONS AND IMPLICATIONS

This study provides evidence that the number of preferred learning styles is important in determining the intention to learn among distance learners. Learners who are flexible in using different learning styles according to their needs and situations are found to be more autonomous. This finding concurs with the findings of Candy (1991), Fitzgerald (2003), and Oladoke (2006) that autonomous learners or those who are self-directed were often *Collaborative* and *Participant*, yet *Independent*. This study has added evidence that comparisons of scores on the four constructs of the LAP-SF and scores on the six learning styles preferences of the GRSLSS produce a greater number of statistically significant correlations than have been found in comparisons of self-directedness and learning styles. These include comparisons of Guglielmino's Self-Directed Learning Readiness Scale (SDLRS) and the GRSLSS (Fitzgerald, 2003), the SDLRS and Kolb's Learning Styles Inventory (LSI) (Oladoke, 2006), and the Oddi Continuous Learning Instrument and the LSI (Hutto, 2009). Specifically, when the relationships of LAP-SF and GRSLSS scores were tested it was found that the higher the LAP-SF score, the greater the variety of learning styles (*Collaborative, Competitive, Dependent*, *Independent,* and *Participant*) being utilized by learners. This evidence has added a new finding to the literature of learning styles and learner autonomy.

It was also found that the number of learning styles utilized by the distance learners correlates significantly with their learner autonomy score. Based on this finding, there is a vital need to take into consideration the diversity of learning styles preferences among the distance learners when approaching the creation of learning activities. Course designers and instructors need to produce offerings that allow for individuals to utilize their preferred learning styles such as *Collaborative, Independent,* and *Participant*, and at the same time leave open the possibility of utilizing *Competitive* or *Dependent* learning styles. In this vein, Gibson (1998) has challenged distance education instructors to "know the learner" (p. 140). She noted that distance learners are a heterogeneous group and that instructors should design learning activities to capitalize on this diversity. Because the distance population has a dynamic nature, instructors should continually assess students' learning style characteristics to facilitate their learning efforts. The current study verified that there is a need for course designers and instructors to familiarize themselves with different learning styles and accommodate them in their planning and teaching.

Finally, while the study findings should be understood to inform educators about the relationship of learning styles preference to learner autonomy in Malaysia, it is interesting to note that such findings are consistent with the general assertion that ethnicity issues appear to influence learning styles preferences. By understanding and planning learning opportunities that emphasize the learning styles preferred by students (i.e., *Collaborative, Dependent*, *Independent,* and *Participant*), instructors can match their teaching strategies with students' learning styles. Doing this may enhance distance learners' capacity to

participate actively in their learning activities. On the part of the learners there is a vital need to realize that maximizing the learning process is ultimately their responsibility and they must take control of their own learning rather than simply depending on the system to decide all aspects of learning events. In light of this, it is recommended that a more detailed study be undertaken in which the relationships of GRSLSS scores and the twenty-two components of the LAP are examined.

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LEARNING PROJECTS OF GRADUATE STUDENTS: AN UPDATE OF TOUGH'S STUDY

C. Amelia Davis, Carrie Bailey, Mary Nypaver, Tracy Rees, and Ralph G. Brockett

There have been many changes in self-directed adult learning since Tough's (1971) original study of adults' learning projects. In an effort to understand the influence of the changes that have taken place over the past four decades, this study's purpose was to revisit the learning project concept using an updated interview schedule reflecting changes in the area of technology. A pilot study of 40 graduate students was conducted using this updated version of the schedule. Study participants were found to be engaged in a variety of learning projects both within and outside of their academic studies. While the individual learner was the most frequently identified planner, the percentage of self-planned projects was lower than found in previous studies.

It has been four decades since the publication of Allen Tough's seminal *The Adult's Learning Projects* study (1971). Today, many adults continue to not realize the number of learning projects they undertake in a typical year. It is only through a process of prompting reflection that they become aware of their involvement in a multitude of projects. Tough's study showed that adults spend a remarkable amount of time each year on major learning efforts. Tough (1978) realized that a typical learning effort requires 100 hours with the typical adult conducting five of them each year. Nearly 70% of these projects are planned by the learners, themselves. Numerous replications of this research with diverse samples since the original study have largely supported Tough's findings.

Considering the technological advances that have taken place since Tough's 1971 work, our research team decided to replicate the *Learning Projects* study using an updated version of Tough's original interview schedule. Building on Tough's assumption that learning is an internal characteristic, we deemed graduate students a likely internally motivated population for seeking out new opportunities to improve knowledge and skills and retain competency in their field. Graduate students, unlike adults not enrolled in higher education, are often busy completing papers, learning projects, and research for classes. They also are more likely to be quite familiar with technology that continues to have a growing impact on adult learning and, therefore, an interesting population with which to replicate the Tough study but with an updated version of the interview schedule. Thus, the purpose of this study was to revisit the learning projects concept with an interview schedule that reflects changes in the area of technology since the original body of learning projects research was published.

SELF-DIRECTED LEARNING AND LEARNING PROJECTS

Self-directed learning (SDL) refers to an educational process in which learners have the primary responsibility for their own educational experiences (Knowles, 1975). It is considered a learning practice in which an individual takes the initiative in identifying learning needs, preparing goals, determining resources, and evaluating outcomes (Ellinger, 2004). SDL has been identified as an approach to knowledge that relies on a person being both responsible for and able to be self-directed in their own learning.

Knowles (1975) described SDL as a process initiated by the individual with or without the help of others to diagnose learning needs, formulate goals, identify resources, select and implement strategies, and evaluate outcomes. According to Knowles, SDL is based on the concept that it is in a learner's best interest to utilize educational methods that encourage the ability to seek and process information effectively in promoting learning. He believed adults have a strong sense of self-direction and that SDL was a major component of adult learning. Knowles introduced the concept of andragogy, which he defined as "the art and science of helping adults learn" (Knowles, 1980, p. 43). One of Knowles' major assumptions was that as individuals mature they become increasingly self-directed.

As noted earlier, one of the first attempts to better understand SDL in adults was made by Tough (1971) as he described learning as an intentional, non-formal effort to learn that is planned and controlled by the learner. Some learning projects are efforts to gain new knowledge, insight, or understanding, while others are deliberate attempts to improve one's skill performance. Tough continues to describe learning by adults as a series of educational experiences of varying time intervals. He established a time minimum of seven hours to help define what he referred to as a sustained learning project or effort. Related learning episodes taken together could also constitute a learning project. Through the 1971 study, Tough concluded that formal education was a small portion of learning efforts initiated by adults, and that the majority of learning is a result of adults' independent efforts.

Building on Tough's original study, numerous researchers replicated the learning projects interview protocol. Included among these were studies of mothers with preschool children (Coolican, 1975), rural and urban adults (Peters and Gordon, 1974), older adults (Hiemstra, 1975), and a U.S. national sample (Penland, 1979). While there were differences in number of projects and percentage of projects that were self-planned, taken as a whole, these studies supported Tough's findings. These and many other replication studies are reviewed in Tough (1978) and Brockett and Hiemstra (1991). For the most part, this research supported Tough's original finding that nearly all adults participate in some form of learning project during the course of a year, and that about 70% of these projects are self-planned.

Once the frequency and nature of learning projects was established through many replications with a wide range of samples and settings, SDL research began to move in new directions and away from the learning projects methodology. Thus, by the mid-1980s, only a very limited number of learning projects studies was being conducted. In the 1990s, two

studies were published that built on the learning projects approach. Clardy (1992, 2000) examined the vocation-related learning projects of 56 adults working in service organizations. Using grounded theory, he identified three types of learning projects: (a) induced, (b) synergistic, and (c) voluntary. Livingstone (1999) developed an interview schedule that was heavily influenced by, but different from, Tough's approach. Conducted as part of the New Approaches to Lifelong Learning (NALL) research network, 1,562 Canadian adults were contacted by telephone about their informal learning activities. The major findings from this study confirmed earlier research that "most adults' individual and collective learning is comparable to an iceberg – mostly invisible at the surface and immense in it's mostly submerged informal aspects" (p. 18).

While both of these studies were heavily influenced by Tough's methodology, each moved in a different direction from that original approach. In the present study, we are seeking to revisit the original learning projects design while at the same time updating portions of the interview protocol to reflect changes that have occurred over the past four decades.

Self-directed learning is not without criticism. Brookfield (1981, 1984, 1985) drew attention to what he deemed limitations of SDL's growing popularity. Brookfield emphasized asserted that Tough's learning projects and Knowles' depiction of andragogy had been a major influence on such increasing popularity, but challenged the Adult Education field to consider limitations of self-directed learning and how they relate to the fundamental principles of the adult education field. Brookfield (1981) identified three limitations to the 1971 study: (a) Self-directed learning was a privilege held by the middle class or highly educated as there were more time and resources available to this group for initiating independent learning projects; (b) the use of a structured interview was potentially leading to participants because when they were interviewed they were given a list of project examples from which to choose plus time to think of additional projects; and (c) there was the question of appropriateness in studying informal, non-institutionalized adult learning versus formalized learning opportunities for adults. Despite his criticisms, Brookfield (1985) acknowledged that SDL place a new emphasis on the adult learner and was important in giving substance to learning outside of formal education.

RESEARCH QUESTIONS

While Tough's study and the other studies mentioned here have all added to the SDL knowledge base, our research team was specifically interested in graduate students and the learning projects they had undertaken in the past year. In addition, we were interested in better understanding how changes in technology during the past three decades might have impacted on the nature of learning projects.

In this exploratory study, we define *learning project* using Tough's (1971) definition: "A series of related episodes, adding up to at least seven hours [in which] at least half of the learner's time is to gain and retain a certain knowledge and skill" (p. 7). This research is

focused and framed specifically on adult learners and with the assumption that all adults possess some degree of self-direction that guides their learning efforts. Our interview schedule, adapted from Tough's original interview protocol, was not specifically focused on technology, but questions related to technology were added to the list of possible projects. We were interested in finding out more about the major source of subject matter for the projects in which adults are currently engaged. Thus, this study was designed to determine the frequency and nature of learning projects undertaken by currently enrolled graduate students in the past twelve months. Specific objectives included the following: (a) The type of project undertaken; (b) the number of hours spent on each project; (c) the nature of the learning effort involved; and (d) the primary planner of each project.

The following research questions guided this study:

1. What is the number of learning projects undertaken by graduate students in the past year?
2. Who is the primary planner in these learning projects?
3. What is the nature of these learning projects?
4. How is the role of technology illustrated in these learning projects?
5. What percentage of the learning projects undertaken by graduate students are non-school related?

METHOD

Participants

Because this was a pilot study, a convenience sample of 40 participants was used. All participants were adult graduate students currently enrolled at a state university with a major in either Nursing or Education. They were recruited in the following ways: (a) Class visits and announcement of the project by the researchers; and (b) email notification of the project announcing the need for volunteer participants. The researchers described the study's objectives and data collection process before asking for volunteer. The researchers also answered any questions potential participants had about the study. Those who agreed to participate were asked to sign an Informed Consent Form.

Instrument

Building on the work of a previous student research team, we modified Tough's *Interview Schedule for Studying Some Basic Characteristics of Learning Projects* (1975), by revising and updating some of the wording. In order to stay current with technological trends in education, elements such as use of the internet and web-based learning were added to the two participant sheets utilized to help participants recall their learning efforts as "some self-planned learning efforts are especially hard to recall six or eleven months later" (Tough, 1971, p. 17). This interview schedule served as the main instrument for collecting data. A demographic sheet was also modified to obtain information regarding the study

participants. Each member of the research team was instructed on how to use the interview schedule and how to identify learning projects.

In order to stay current with technological trends in education, elements such as use of the Internet and web-based learning were added to the two participant sheets that were used to help participants recall their learning efforts as "some self-planned learning efforts are especially hard to recall six or eleven months later" (Tough, 1971, p. 17). The researchers believed that by adding a few statements to the participant sheets pertaining to technology the interview schedule would be better suited for the current learning experiences of graduate students, yet the study's validity would remain intact.

Data Collection

Quantitative data collection methods were used in this study. There were two sources of data: (a) a demographic form, and (b) interview data collected on the *2008 Learning Projects Interview Schedule* data collection sheet. Each participant was interviewed by one of the researchers using the interview schedule updated by our research group and data were recorded by hand on that collection sheet. After each interviewer had conducted an initial pilot interview, the group of interviewers met to discuss the interview procedure and check for interview consistency across interviewers in order to enhance reliability of the study.

Closely following Tough's (1971) understanding that time is an integral part of any deliberate learning effort or project, information regarding the number of hours spent on each project was collected. Tough chose seven hours as the minimum number for a learning project in the 1971 study because "a seven hour period is equivalent to one work day" (p. 14). For this project, that minimum number was increased to eight hours, which was deemed by the researchers as currently equivalent to one working day. Projects described as involving more than eight hours were followed up with a series of probing questions and multiple choice questions to better understand what was involved.

Each interview took place in an agreed upon quiet and private location in order to maintain the confidentiality of each participant. Depending on how many learning projects each participant had undertaken, the length of the interviews varied, but most took about an hour. As no identifying participant data were collected, each participant was assigned a unique alphabetical/numerical code matching the researcher's last name and interview number.

Data Analysis

Statistical analyses were conducted on the data collected once all interviews were completed and added into a statistical analysis file. In the first stage, demographic characteristics were coded and calculated by percentage for graduate program of study, race, and ethnicity. In an initial analysis, participant projects were coded and placed into one of four categories: (a) Work/Career, (b) Degree/Education, (c) Personal Growth/ Change, or (d) Hobby/ Avocational. The data were also examined to determine the specific

project characteristics for the following three categories: (a) type of planner, (b) total hours, and (c) credit versus non-credit status.

In the second stage, seven multivariate analyses of variance (MANOVAs) were conducted for both program type and category under seven different factors described in detail later. There were multiple dependent variables in this study. Therefore, multivariate analysis of variance was chosen because it allowed data to be analyzed that involved more than one dependent variable at a time.

RESULTS

Demographic data were collected for each participant (see Table 1). Seven males (17.5%) and 33 females (82.5%) participated in the study. One participant self-identified as Asian, four as Black, African American, or African Descent, and 35 as White. Twenty-five participants (62%) were Education majors while 15 (38%) majored in Nursing. Participants ranged in age from 22 to 63 years with a mean age of 41.

Table 1. *Demographic Characteristics of Participants*[*]

Category	*Number*	*Percent*
Ethnicity:		
Asian	01	2.5
Black, African American, African Descent	04	10.0
White/Caucasian	35	87.5
Gender:		
Female	33	82.5
Male	07	17.5
Graduate Program:		
Education	25	62.5
Nursing	15	37.5

[*] n=40

A total of 435 individual learning projects were recorded. As shown in Table 2, the number of learning projects ranged from 3 to 25 projects per participant. Of these, 208 (47.8%) of the projects were planned primarily by the learner, followed by 65 (14.9%) of projects planned by a group with a leader. The mean number of projects was 10.87 and 32.4% of projects were not for credit. Participants spent more than 40 hours on 50.1% of projects recorded and between 8 and 40 hours on 49.9% of the projects. In terms of technology usage, 41.5% cited computer technology as the major source of information. This included the Internet, web videos, electronic journals, computer programs, software, and webinars.

Table 2. *Characteristics of Learning Projects*[*]

Project Characteristics	*Number*	*Percent*
Credit Status:		
For Credit	294	67.6
Not for Credit	141	32.4
Planner Type:		
Group with a Leader	65	14.9
Learner (Self-Planned)	208	47.8
Mixed Planner	61	14.0
Object (Nonhuman Resource)	8	1.8
One-to-One Professional	38	8.7
Peer Group	34	7.8
Total Hours:		
8 – 40	217	49.9
41 or More	218	50.1

[*] n=435

Since the participants in this study engaged in a variety of learning projects, the researchers found it necessary to categorize the projects into specific groups. The projects were categorized into four groups that included the following: (a) Degree/Education; (b) Hobby/Avocational interests; (c) Personal Growth/Change; and (d) Work/Career. Degree/Education projects included those undertaken for credit, as well as for non-credit, such as conference participation or personal research related to graduate study. Hobby/Avocational projects included activities for entertainment or personal enrichment, escape from daily routine, personal interests, and things people do for enjoyment. Personal Growth/Change included family situations, health, life transitions, and spirituality. Work/Career related projects included any project that was undertaken to increase knowledge, skills/tasks, or opportunities in a current or future job.

Table 3 represents the number of projects completed in each category as described by the participants. There were significantly more projects completed in the Degree/Education and Hobby/Avocational categories than in the other two ($p < .05$). One hundred fifty-one projects (34.7%) were identified as Degree/Education related, closely followed by Hobby/ Avocational with 31.3% (n = 136) of projects completed in that category. The least number of projects (n = 65, 14.9 %) were carried out in the Work/Career category, placing Personal Growth/Change as the third largest category with 83 (19.1%) projects completed in this area.

Table 3. *Learning Projects Categories*

Project Characteristics	*Number*	*Percent*
Degree/Education	151	34.7
Hobby/Avocational	136	31.3
Personal Growth/Change	83	19.1
Work/Career	65	14.9

* *n*=435

In order to take a closer look at the data, seven multivariate analyses of variance (MANOVAs) were conducted for both program type and category under seven different variables: (a) Benefit to Others, (b) Credit, Planner, (c) Effort, (d) Enthusiasm, (e) Hours Spent on Each Project, and (f) Knowledge Gained. The dependent variables for program type were Education and Nursing. The dependent variables for learning projects categories were (a) Degree/Education, (b) Hobby/Avocational, (c) Personal Growth/Change, and (d) Work/Career. Tests determined there were no significant differences between program types under any of the variables, but significant differences did exist between dependent variables within the following categories: Benefit to Others, Credit, and Planner. There were no significant differences between dependent variables under the categories of Effort, Enthusiasm, Hours Spent on Each Project, or Knowledge Gained. For each MANOVA, follow-up univariate analyses of variance (ANOVAs) were conducted to determine where significant differences were between the dependent variables (Table 4).

Table 4. *For Dependent Variables Benefit to Others, For Credit, and Self-Planned Multivariate Results*[**]

Category	*F*	*Means*
Benefit to Others:		
Hobby/Avocational	5.835	2.540
Personal Growth/Change	5.835	3.210
Work/Career	5.835	3.150
For Credit:		
Degree/Education	21.930	.615
Self-Planned:		
Degree/Education	8.106	.184
Hobby/Avocational	8.106	.533
Personal Growth/Change	8.106	.513

** Significant at .001 level; degree of freedom = 1

A one-way multivariate analysis of variance (MANOVA) was conducted to compare the means of projects completed *for credit* in the categories of Work/Career, Degree/Education,

Personal Growth/Change, and Hobby/Avocational interests. There was a significant difference in the mean number of projects completed *for credit* between categories, (Λ = .35, $F(3, 36) = 21.930$, p = < .001). Post-hoc comparisons of the four categories indicate that the projects completed in the Degree/Education category (M = .615, 95% CI [.490,739]) had a significantly higher number of projects completed *for credit* than the other three categories: Work (M = .213, 95% CI [.103, .323]), p = < .001, Personal Growth/Change (M = .078, 95% CI [.012, .143]), p = < .001, and Hobby/Avocational (M = .104, 95% CI [.038, .170]), p = < .001. These results suggest that the type of project does have an effect on whether or not credit was earned by completing the project. Moreover, our results suggest what may have already been known to be true: More Degree/Education related projects are taken *for credit* than are Work, Personal, or Hobby related projects.

There was also a significant difference in the mean number of projects that were *learner self-planned* (Λ = .60, $F(3, 36) = 8.106$, p = <.001). Post-hoc comparisons of the four categories indicated a significant difference in the mean number of *learner planned* projects between the categories of Personal Growth/Change (M = .513, 95% CI [.382, .644]) and Hobby/Avocational (M = .533, 95% CI [.410, .657]), p = <.001 with Degree/Education (M = .184, 95% CI [.085, .283]), p = <.001. There was no statistical significance for Work/Career related projects that were planned by the learner (M = .360, 95% CI [.222, .498]), p = <.001 and the other three dependent variables. These results suggest that the highest number of *learner planned* projects occur in the categories of Personal Growth/Change and Hobby/Avocational while the least number of *learner planned* projects are related to Degree/Education.

The MANOVA conducted for how the participants rated the *benefit to others* for the learning projects they completed indicated statistical significance between dependent variables (Λ = .47, $F(3, 15) = 5.853$, p = .007). Post-hoc comparisons of the four dependent variables indicated a significant difference between the mean *benefit to others* for Work/Career (M = .3.15, 95% CI [2.79, 3.52]) and Personal Growth/Change (M = .21, 95% CI [2.89, 3.54]), p = .007 when compared with Hobby/Avocational projects (M = 2.54, 95% CI [.2.16, 2.92]), p = .007. There was no significance for the *benefit to others* between Degree/Education related projects and the other three dependent variables. These results indicate that participants deemed their Work/Career related projects as well as their Personal Growth/Change projects to have a greater *benefit to others* than projects related to their Hobby/Avocational interests.

Thus, in summary, the major findings from our analysis of data indicate the following:

- Participants completed an average of 10.9 projects per year;
- 47.8 percent of the projects were self-planned;
- Participants spent more than 40 hours on 50.1% of projects recorded and between 8 – 40 hours on 49.9% of the projects;
- 41.5 percent of projects were cited as having computer technology as the major source of information;

- More projects are undertaken for credit in the Degree/Education category than in any of the other categories;
- The highest number of learner planned projects were in the areas of Personal Growth/Change and Hobby/Avocational;
- The least number of learner planned projects were in the Degree/Education category;
- Participants deemed projects completed for Work/Career and Personal Growth/ Change to be of greater benefit to others than projects in the Hobbies/Avocational category.

DISCUSSION

While the percentage of total projects planned by the learner (47.8%) was less than the percentage of projects Tough (1971) found to have been planned by the learner (68%), we conclude this is due to the participant demographic, as all volunteers were current graduate students. Thus, this finding was not surprising. As stated earlier, adult graduate students, unlike adults not enrolled in school, are often busy completing papers, projects, and research for classes. Such activities led to that smaller percentage of projects being planned by the learner and a larger number of projects being planned by a group with professional.

Since Tough's original study, advances in technology have progressed at an accelerated rate. Consider the fact that in the 1970's the Internet was still under control, for the most part, by the Department of Defense, and the cell phone would not be invented until 1979 (Bellis, 2010b). There were no flat screen televisions, most homes had only one television if they had any, and the IBM personal computer (PC) would not be released until 1981 (Bellis, 2010a). Today, we live in a world dominated by technology. Computers and the Internet have become an integral part of education and life. They have allowed knowledge and information to become easily accessible. Consequently, as technology has changed and its use increased, so have the resources and techniques by which we learn. The role of technology is of particular importance in projects taken on by participants in this study and signals a need to conduct research with other groups of adults to determine the role of technology in the demand for lifelong learning.

Findings that were especially noteworthy include the determination of no significant difference in the average amount of effort put forth in any one project category. While findings cannot be generalized, this is important because it demonstrates a high level of self-directedness within this particular graduate student population, regardless of the type of project being completed. In other words, graduate students put just as much effort into their Hobby/Avocational interests as they do their Degree or Work related projects. This reflects much about the participants in this pilot study, both individually and collectively, and their ability to balance different projects.

A finding that was a bit surprising and not easy to explain is how Work/Career related projects were the least frequently identified type of learning project. Perhaps this is due to

the predominance of credit related projects, which may be perceived to some degree as career related. In any case, findings indicate that for this particular sample of graduate students, Work/Career related learning project activity was limited.

Results suggest more Degree/Education related projects were taken for credit than were Hobby, Personal or Work related projects. This was an expected finding for researchers as very few projects outside of education are often taken for credit, though some work related projects may have been aimed towards professional licensure. Following suit, the least number of learner planned projects were categorized as Degree/Education related. This reflects on the greater ideological and systemic framework of the U.S. higher education system that tends to focus on accreditation, degree completion, and licensure. While more of their Hobby/Avocational interests were self-planned, the participants perceived more benefit to others from projects classified as Personal Growth/Change and Work/Career related projects. This statistically significant finding can lead to the perception that greater benefit to others comes from projects that extend beyond the learners themselves.

Although the purpose of this study was to revisit the learning projects concept with an updated interview schedule, there were several things learned that reflected changes in the area of technology since the original study. Computer technology proved to be a major source in obtaining information for this population. There is an increased use of Internet and web-based learning projects which may make learning more efficient and accessible from a variety of locations. Web-based or technological learning projects were not always education or work related, demonstrating that technology can be used for self-directed projects that reflect personal interests and hobbies.

LIMITATIONS

Several limitations were identified in this study. One limitation pertains to the element of culture. As Brockett and Hiemstra (1991) point out, much of the criticism of self-directed learning stems from perceptions regarding a failure to consider culture and, instead, overemphasize the individual. Because culture exists in historical, institutional, political, and social forms, its impact on self-directed learning is inevitable. Institutionalized culture was predominant in this study as all the participants were current graduate students. This particular cultural element should be considered when interpreting the study findings because learning projects cannot be isolated from the forms of culture in which they take place.

Another limitation is the study sample. This pilot study utilized a convenience sample of participants. Graduate students were chosen due to proximity and a large potential sample number available to the researchers. However, many of the targeted population had dispersed for the summer, the time period the research team was using for gathering data. This timing for data collection limited the potential pool of participants, therefore limiting the sample diversity more than expected. As noted in Table 1, the study sample consisted mostly of females (82.5%), which may not accurately reflect graduate programs in

Education and Nursing. Further, with only three racial/ethnic groups represented, the sample leans heavily toward white graduate students, while not reflecting all racial and ethnic groups enrolled in the respective graduate programs studied. We acknowledge future research should include a random sample that would allow for a more diverse respondent base than primarily white female graduate students.

The third limitation is related to the revision of Tough's original interview schedule. The schedule was revised in order to measure modern learning tools such as computer technology and web-based learning by adding these items to the original schedule. In addition, rather than trying to estimate the actual amount of time spent per project, we revised the schedule to include three categories for hours spent on each project: (a) Less than 7 hours, (b) 8-40 hours, and (c) 40 or more hours. The 8-40 and 40 and above categories were used in the study and projects with seven or fewer hours were eliminated. The overlapping categories could have been confusing for participants and posed a potential limitation in data collection and report. Revising the interview schedule in these ways may have led to more subjective interpretations than the researchers accounted for, possibly skewing some participants' individual perceptions and/or responses.

A final limitation of this study is that data collection relied entirely on self-reporting through use of the revised interview schedule. Because participants were reporting on themselves, their ideas and perceptions were based on their own understanding, which is derived from their own personal experience. Marsick (2003) posits that when a participant is self reporting this poses a limitation to the study due to "the very nature of informal learning makes it prone to self-distortion because it is, by its nature, tacit, opportunistic, and not typically highly conscious" (p. 391). Because people are all individually different and have different perceptions of themselves, responses, when being self-reported, may not be congruent with the researchers' understanding and may also differ from the understandings of other participants.

IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH

Although this research was conducted as a pilot study to look at self-directed learning projects and graduate students, especially in light of technological advances since Tough's original (1971) research, several noteworthy considerations, implications for practice, and future research needs emerged as a result. Self-directed learning research needs to take an expanded scope to include not only individual but social dynamics of self-directed learning (Brockett, 2009). An expanded scope can provide a more comprehensive understanding of the field, as well as better understand how technological advances directly impact SDL through the use of such innovations as online instruction and Internet-based social networks.

Research provides a stronger link between SDL and higher education. As depicted in this study, only a few degree-related projects were planned by the learner. Utilizing a more self-directed approach in higher education classrooms through the use of learning contracts

(Hiemstra, 2010) would allow for more student-led learning both in and outside of the classroom, connecting different areas of the learner's life.

Additionally, the study findings suggest enough time has elapsed since the earliest learning projects studies that it can be fruitful to undertake more studies using the updated interview protocol developed by the researchers. As suggested earlier, such research can seek more diverse populations to broaden the knowledge base and help clarify an understanding of changing learning patterns that may have emerged over the past four decades.

Finally, it is believed important for those who study SDL to use a critical lens when looking at adult learning as it relates to various socio-economic groups and the resources available to these groups. Though Brookfield (1984) and Brockett (1985) both agreed a more critical paradigm utilizing, for example, qualitative approaches, should be adopted in SDL research, this study's research group found that much of the recent related literature in general, and more specifically pertaining to learning projects, has not adopted such a framework for data collection, analysis, and interpretation.

Likewise, the study's research team did not adopt a critical paradigm either. Had this been done, the findings related to technology and the type of projects undertaken may have varied significantly, indicating context to be an integral component of learning projects. This is attributed to an understanding that much SDL research continues to rely heavily on quantitative methods and analysis, whereas a qualitative approach would allow researchers to increase the scope of their understanding of SDL by examining participants' personal experiences and how those experiences have led to self-direction or not.

As we embark on a new decade in the 21st century, it is important to reflect on past scholarship to determine how far we have come as an area of study, as well as identify where we are headed. It is important to recognize learners' independence and the use of technology in self directed learning. Due to changes happening in SDL as a result of readily available technology such as the World Wide Web, social networks, and online instruction, educators must be creative in finding ways to incorporate new technology and resources in a variety of settings. Hopefully, this study will enable a new generation of educators, researchers, and scholars gain a better understanding of the nature of adult learning in this new century. It is anticipated that this pilot study will serve as a modern stepping stone, inviting other researchers to expand and continue this line of research.

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TEACH ME HOW TO LEARN: PRINCIPLES FOR FOSTERING STUDENTS' SELF-DIRECTED LEARNING SKILLS

Gregory M. Francom

In a world of rapidly changing careers and practices, adequate career and life preparation means more than the acquisition of a fixed body of knowledge. Teachers in formal education need to provide learning experiences that foster students' self-directed learning skills. A review of the self-directed and self-regulated learning literature reveals four main prescriptive principles for fostering students self-directed learning skills in formal education: (a) Match the level of self-directed learning required in learning activities to student readiness; (b) progress from teacher to student direction of learning over time; (c) support the acquisition of subject matter knowledge and self-directed learning skills together; and (d) have students practice self-directed learning in the context of learning tasks. It is hoped that these principles can guide the design of teaching and learning activities in educational settings.

INTRODUCTION

Self-directed learning (SDL) skills are among the most important skills that formal education can foster among students (Bolhuis, 2003; Grow, 1991; Meichenbaum & Biemiller, 1998). SDL skills enable learners to self-direct and self-regulate independent learning processes. Conditions such as increased career change frequency (U. S. Bureau of Labor Statistics, 2008) and increased availability of information (Lyman & Varian, 2003) currently make SDL both more necessary and possible in everyday life. Evidence indicates that adequate career and life preparation for graduates means more than acquisition of a specified body of knowledge (Brown, 2000; Sterns & Dorsett, 1994). To stay current, graduates need to know how to independently acquire and apply knowledge effectively.

A major focus in the SDL literature is on increasing students' SDL skills within formal educational environments (Merriam, Caffarella, & Baumgartner, 2007). Efforts have been proposed, developed, and implemented to help students increase their capacity to conduct their own learning (Candy, 1991; Merriam et al., 2007). The purposes of this paper are to discuss the need for fostering SDL skills among students in formal education and synthesize the literature to present principles for fostering these skills within teaching and learning situations.

WHY FOSTER SELF-DIRECTION IN FORMAL EDUCATION?

There is evidence that efforts to increase SDL skills among students are sorely needed. Countries around the world have emphasized building students' SDL skills and career mobility data in the United States supports the conclusion that learning will continue

throughout life. In addition, learning in school may be quite different from learning outside of school (Resnick, 1987) underscoring the need for graduates to have SDL skills.

U.S. educational institutions have been challenged to develop new and innovative pedagogies to support previously neglected skills such as those needed for independent learning (The Secretary of Education's Commission on the Future of Higher Education, 2006; The Secretary's Commission on Achieving Necessary Skills, 1991). These types of outcomes have been advocated more particularly in science learning on the national stage by the National Committee on Science Education Standards and Assessment (1996). In this report, teachers are encouraged to foster SDL skills by offering students the opportunity to take responsibility for personal learning, conduct self-assessments, and participate in the design of learning environments (see also Bransford & Donovan, 2005).

Similarly, institutions and governing bodies outside of the United States have long emphasized the importance of SDL and lifelong learning for education. Notable initiatives and SDL related activities have been implemented in European countries such as Belgium, France, Italy, Greece, Switzerland, The Netherlands, and the United Kingdom with national reports focused on SDL from many of these countries (Straka, 1997). Additional SDL-focused reports of research and advocacy have come from areas as diverse as Asia (Chu & Tsai, 2009; Mok, Cheng, Leung, Shan, Moore, & Kennedy, 2007), Australia (Candy, 2004), and South Africa (Lindh & Hugo, 2005). It is clear that many countries around the world believe that fostering SDL skills is vital in our global economy.

Career Mobility

In addition to national reports, career mobility data give support for the assumption that education should produce graduates who are able to independently direct their own learning. The career climate is currently different for those entering the market than it has been in the past (Brown, 2000; Neal, 1999). Graduates can no longer count on keeping the same job or using a similar set of skills for each work situation. In most careers, some SDL skills will likely be needed to keep up with career changes (Guglielmino, 2008). Within the United States, there is abundant evidence that graduates will change jobs and careers many times in the course of their lifetime. Data on career mobility show that educational focuses that provide an increased level of specialized career preparation may be inadequate to prepare graduates for all careers that they will encounter in their life after school is over (U. S. Bureau of Labor Statistics, 2008). In a United States bureau of labor statistics study, men and women held an average of 10.8 different jobs from ages 18 to 42 and the number of job changes that individuals with a bachelor's, master's or PhD experienced was found to be slightly higher than those without a degree (U. S. Bureau of Labor Statistics, 2008).

Past career studies have viewed workers as relatively stable in their jobs and careers. These individuals followed somewhat prescribed career paths and practiced their professions using similar skills over time (Brown, 2000). In contrast, The Bureau of Labor statistics noted above indicate that this past ideal of job stability has been supplanted with job flexibility and adaptability as workers frequently change jobs because of layoffs, firings,

and economic reasons (Brown, 2000; Neal, 1999). Job security has become closely associated with an individual's resilience and career management skills in which continued learning plays an important role (Sterns & Dorsett, 1994).

Education has prepared students for careers in the past career mobility model. Typically students chose a single major and took specialized classes to give them the skills and knowledge for work in a specific field of practice. However, careers are currently becoming less narrow in knowledge and skills required to complete them (Arthur & Rousseau, 1996), as well as the availability of information from which practicing professionals can independently acquire and apply knowledge, are increasing at an almost exponential rate (Lyman & Varian, 2003). While U.S. universities and elsewhere work to provide a solid foundation for future careers, it may still be difficult or impossible to completely prepare students with the skill and knowledge needed to succeed in their future. Graduates will face situations and experiences different than those faced in their educational preparation.

Learning in Post-Education Settings and Learning in Education

With an increased likelihood of career changes, graduates will need learning skills to help them stay current. However, learning within school and learning outside of school may also be very different activities, and the type of learning undertaken in educational settings may not give students the skills they need to self-direct their own learning outside of educational settings (Bolhuis, 1996; Resnick, 1987).

Based on studies of learning experiences in what she terms "practical settings," Resnick (1987) suggests dimensions upon which learning out of school differs from learning in school:

1. Individual cognition in school versus shared cognition outside (p. 13);
2. Pure mentation in school versus tool manipulation outside (p. 13) (i.e., pure thought is valued in education but cognitive and physical tools are used outside of school);
3. Symbol manipulation in school versus contextual reasoning (p. 14); and
4. Generalized learning in school versus situation specific competencies (p. 15).

Resnick also suggests that more effective career preparation is needed and that education can focus on helping increase student ability to adapt to the different situations they will encounter outside of school.

In addition, descriptions of SDL in settings outside of school indicate that learners follow a general process that is very different than learning processes more typical in school. The SDL process involves determining a task to complete or a problem to solve, deciding on the necessary steps to take, finding resources to use in the learning process, maintaining attention toward learning activities, and making needed adjustments within the learning process (Brockett & Hiemstra, 1991; Garrison, 1997; Knowles, 1975; Tough, 1979). In

order to carry out such activities, learners may need skills such as goal setting, metacognition, mistake detection, preflection (choosing appropriate tasks for learning), and reflection (Flavell, 1979; Meichenbaum & Biemiller, 1998; Van Merriënboer & Kirschner, 2007; Van Merriënboer & Sluijsmans, 2009). Students are not often given the opportunity to use these skills in teacher-directed learning processes that often occur in education (Bolhuis, 1996). For instance, learning activities in school are often chosen by a teacher, the learning steps are often prescribed, the learning resources are given, and adjustments are often made by a teacher, limiting students' opportunities to set goals, choose learning activities, reflect on performance, and detect learning mistakes.

Moreover, preliminary studies have found that the undergraduate experience in general (Preczewski, 1997) and in engineering (Litzinger, Wise, Lee, & Bjorklund, 2003) did little to improve students' self-direction. Something more beyond what educational institutions are currently doing may be needed to give students opportunities to practice self-direction. Some higher education institutions have begun to take notice of career mobility data and take into account the skills needed for SDL (Guglielmino, 2008). Fostering more SDL skills offers a way to help students help themselves and adapt to the need for learning that is different than regular school learning as career and life changes come their way.

FOSTERING SELF-DIRECTED LEARNING SKILLS IN FORMAL EDUCATION

While there are a variety of contextual factors that affect an individual student's ability to self-direct their learning within formal education, research and theory suggest that much can be done at the teaching-learning transaction level to foster SDL skills. Most teaching and learning methods adopted in formal education for fostering SDL skills are focused on increasing the capacity of students to direct their own learning processes through practice doing so (Merriam et al., 2007). However, fostering SDL skills in education involves more than simply reducing the amount of support and guidance given to students, as such approaches may be detrimental to the acquisition of knowledge in long term memory (Kirschner, Sweller, & Clark, 2006).

There currently is a need to provide teaching and learning experiences that help students gain skills for SDL. A review of the self-directed and self-regulated learning (SRL) literature was conducted to find principles for guiding teachers as they seek to provide learning experiences that foster students' SDL skills in formal education. The terms self-directed learning and self-regulated learning have often been used interchangeably in the literature and these concepts have many similarities (Loyens, Magda, & Rikers, 2008; Zimmerman & Lebeau, 2000). Both SDL and SRL definitions have involved learners who set goals, implement learning plans, self-evaluate, and make use of metacognition, motivation and domain knowledge (Loyens et al., 2008). Descriptions of SDL skills usually encompass SRL skills and abilities in the literature (Loyens et al., 2008; Pilling-Cormick & Garrison, 2007). Therefore both SDL and SRL literature were used in this review. Because various motivational, personal, and volitional factors affect a person's engagement in SDL,

and because formal education settings involve multiple students in a single class, these principles are presented as general ways teachers can structure student learning activities.

Principles for Fostering Students' Self-Directed Learning Skills

In order to determine principles for fostering students' SDL skills in formal education, a review of the empirical and theoretical literature was conducted by searching terms such as learner self-direction, self-directed learning, self-directed learning skills, self-direction, self-regulated learning, and self-regulation. This review was limited to those interventions reporting changes in student ability to self-direct or self-regulate learning or yielding prescriptive principles to be used within teaching and learning situations. Four main prescriptive principles for fostering self-directed learning skills from research, theory, teaching, and learning models were revealed (see figure 1):

1. Match the level of self-directed learning required in learning activities to student readiness
2. Progress from teacher to student direction of learning over time
3. Support the acquisition of subject matter knowledge and self-directed learning skills together
4. Have students practice self-directed learning in the context of learning tasks.

These principles will be discussed and supported with relevant theoretical and empirical literature.

Principle One; Match the Level of Self-Directed Learning Required in Educational Activities to Student Readiness

The first principle for fostering self-directed learning skills involves matching the level of SDL required in educational activities to student readiness (Bolhuis, 2003; Brockett & Hiemstra, 1991; Grow, 1991; Hammond & Collins, 1991; Knowles, 1975). Adult learning literature acknowledges that individuals may be highly self-directing in some situations and not in others, or that they may be somewhere in between high and low on the self-directing continuum (Candy, 1991; Knowles, 1980; Knowles, Holton, & Swanson, 1998). A student's level of relevant domain knowledge and SDL experience also will affect whether they are able to self-direct learning in a given situation (Candy, 1991; Grow, 1991). SDL activities that this principle applies to may include allowing students to set learning goals, specify what will be learned, determine the pace of learning, and evaluate learning outcomes (Hiemstra, 1994). If a student is required to do these activities without regard to readiness, he or she may fail to learn or increase in SDL skills (Brockett & Hiemstra, 1991; Candy, 1991).

Findings from studies of SDL and SRL indicate that many students are not ready to completely control a learning situation, and may need to first experience teacher-directed learning (Howland & Moore, 2002; Raidal & Volet, 2009). Dynan, Cate and Rhee (2008) found that students whose SDL readiness is matched to a requisite learning structure (structured learning or unstructured learning) increased in self-direction over the course of a

semester to a greater degree than those who were not matched. Bhat, Rajashekar and Kamath (2007) found that a high level of SDL activities helped high performing students learn while these activities did not benefit lower performing students' learning. These findings suggest that matching the level of SDL activities required to student readiness may be important for helping students learn and increase in SDL skills.

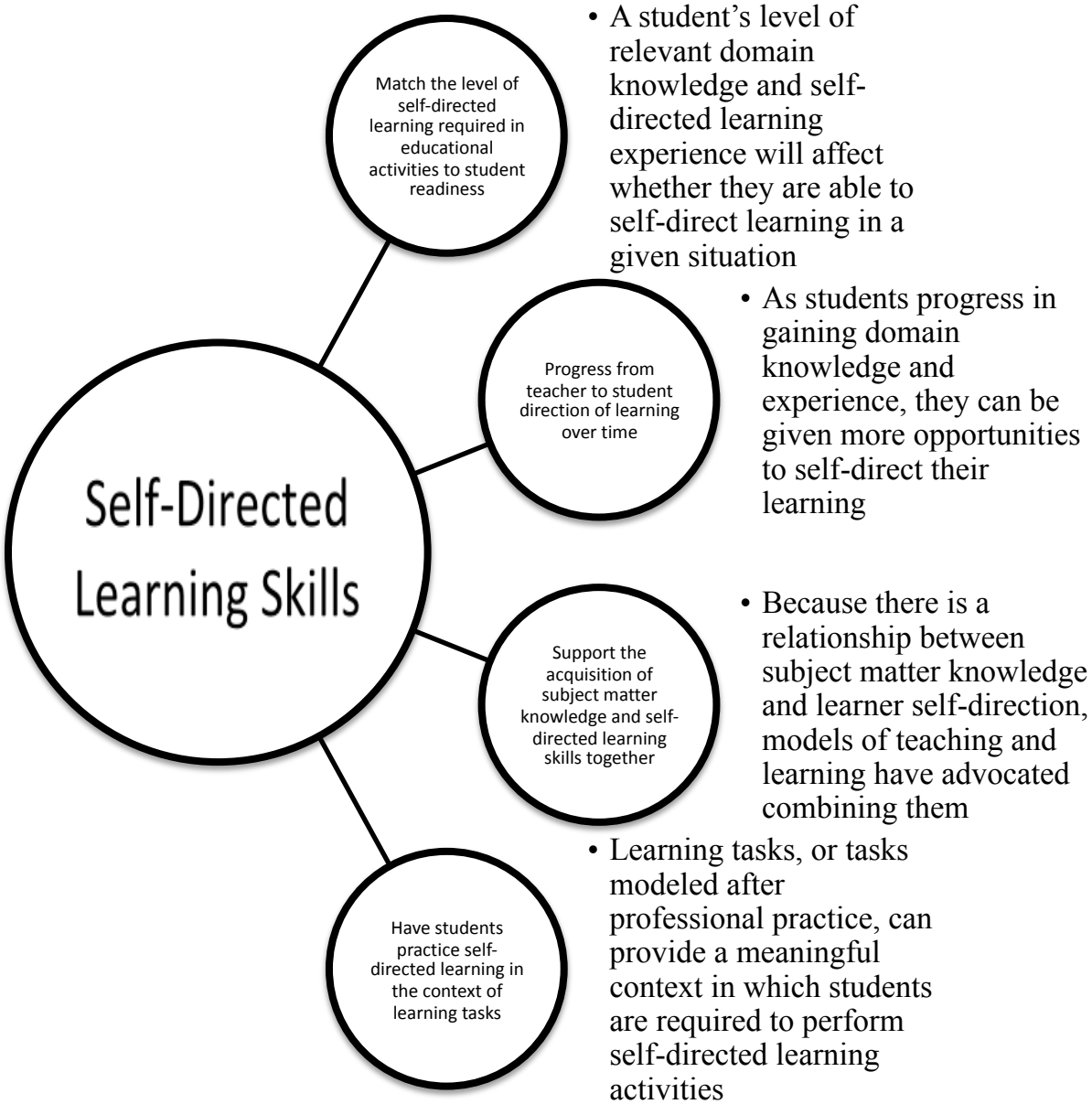

Figure 1. General principles for fostering self-directed learning skills in formal education.

To determine a student's level of SDL skill or readiness, a variety of instruments have been proposed and implemented in the literature. Quantitative instruments include the Self-Directed Learning Readiness Scale (SDLRS) (Guglielmino, 1977), the Oddi Continuing Learning Inventory (Oddi, 1986), the Learner Autonomy Profile (Confessore & Park, 2004), and PRO-SDLS (Stockdale, 2003). Each of these scales use Likert-type questions that participants answer within a questionnaire. Many exploratory studies have used such instruments to correlate self-directedness and SDL skills to differing factors including achievement in education, managerial positions, per-capita income, and workplace performance. A few studies have gone beyond exploratory correlation and have used the SDLRS and other instruments to measure an increase in SDL readiness over time due to factors such as information seeking activities and class structure (Dynan et al., 2008; Gabrielle, Guglielmino, & Guglielmino, 2006).

Principle Two: Progress From Teacher to Student Direction of Learning Over Time

The second principle advocates progressing from teacher to student direction of learning over time (Bolhuis, 2003; Brockett & Hiemstra, 1991; Candy, 1991; Grow, 1991; Meichenbaum & Biemiller, 1998). This principle takes students from their current level (as suggested in principle one) toward higher self-direction over time. Prescriptive models of SDL offer practices for gradually increasing student direction of the learning process. For example, students can be increasingly allowed to set learning goals, specify what will be learned, choose learning resources, and evaluate learning outcomes as a learning experience progresses (Grow, 1991; Hiemstra, 1994). Such an approach should take into account the first principle and provide students with SDL activities that match their readiness. Students' SDL skills may increase as opportunities to self-direct learning are increasingly provided.

Azevedo, Cromley, and Seibert (2004) suggest that shifting learning responsibility toward students over time by scaffolding and fading support for SRL and SDL skills is vital for the teaching of SDL skills. Hadwin, Wozney, and Pontin (2005) followed the SRL development of graduate students in a research methods class for several months. They found that the general process in this setting involved teacher-direction that progressed to co-direction and finally student-direction of the learning process. This shift toward student direction of the learning process was also found in elementary school classrooms considered high in SRL (Perry, VandeKamp, Mercer, & Nordby, 2002). Schunk and Rice (1993) found that fading self-regulatory instructions were superior to self-regulatory instructions that were not faded in helping students with reading problems to self-regulate their learning. These studies suggest that gradually increasing student direction of the learning process may foster SDL skills.

Three teaching and learning models exemplify this principle. The staged self-directed learning model (Grow, 1991) proposes four stages of student readiness for SDL: (a) dependent, (b) interested, (c) involved, and (d) self-directed. The teacher's purpose, regardless of the stage that students are in, is to help students advance in their learning independence to allow them to become more self-directed. Meichenbaum and Biemiller's (1998) model for nurturing independent learners emphasizes the importance of education in helping students independently perform tasks. Students are required to increase

independence along three dimensions: (a) skill and vocabulary (simple to complex), (b) planning and application complexity (near to far transfer), and (c) self-direction (acquisition to consultation). Students are said to increase in self-direction as they continue to improve in all three areas. Process oriented teaching (Bolhuis, 2003) also advocates a steady progression toward student regulation of learning processes over time.

Principle Three: Support the Acquisition of Subject-Matter Knowledge and Self-Directed Learning Skills Together

The third principle for fostering self-directed learning skills involves supporting student acquisition of subject matter knowledge along with those skills. Cognitive strategies (such as those required for SRL and SDL) require the use of intellectual skills (concepts, rules, etc. of a discipline) which require basic knowledge of subject matter (Gagné, 1985). Theoretical models of SDL have recognized that some domain knowledge is necessary for learners to be able to take responsibility for learning (Bolhuis, 2003; Grow, 1991). Learners should be introduced to relevant domain knowledge including underlying principles, procedures for knowledge acquisition, and generalizability of knowledge and practices as they practice SDL skills (Bolhuis, 2003; Vermunt & Verschaffel, 2000).

Extensive domain knowledge may enable learners to free up working memory for processes related to self-regulation and self-direction of learning (Sweller, Van Merrienboer, & Paas, 1998). Literature on the differences between experts and novices indicates that experts have elaborate mental knowledge structures that enable them to monitor progress, choose appropriate strategies, and decide on appropriate solutions to problems (Chi, 2006). Novices lack these knowledge structures and consequently are unable to conduct learning and performance activities with as much efficiency as experts.

Glaser and Brunstein (2007) found that providing instruction on both subject matter and SRL skills was more effective for helping students self-direct their learning than simply teaching subject matter. Cotterall and Murray (2009) provided SDL opportunities to students in a language learning course including allowing students to decide what to learn and choose resources to use for learning. The authors conclude that these elements of the course structure along with subject matter acquisition contributed to an increase in students' SDL skills.

Principle Four: Have Students Practice Self-Directed Learning in the Context of Learning Tasks

The fourth principle for fostering self-directed learning skills advocates having students practice such skills within the context of learning tasks. Studies of self-directed learners describe many learners as task-oriented, with the practical aim of applying learning to a specific task (Houle, 1961; Tough, 1979). Consequently, models of SDL have advocated providing learning that is centered on tasks that learners are likely to encounter in the future (Bolhuis, 2003; Hammond & Collins, 1991). Outside of the SDL literature, many new theories and models of instruction have focused on the use of learning tasks in education (Brown, Collins, & Duguid, 1989; Merrill, 2002; Van Merriënboer & Kirschner, 2007).

The learning-task orientation to education may have roots in the pragmatic views of the American philosopher, John Dewey (1916, 1938). In his view, education is a continuous reconstruction of experiences and subject matter in school has no inherent value unless it is related to a student's outside-of-school activities and experience. Yet Dewey (1938) posited that too often in education, knowledge is acquired in isolation from other relevant knowledge and experience, making the useful application or transfer of such knowledge to real-world situations difficult or impossible. One danger of formal education is the split between experiences gained in school and experiences needed for life.

The idea that education should enable students to independently perform tasks useful in settings outside of school continues to influence many practitioners and researchers. In this view education should provide career preparation as well as other knowledge and skills that will help graduates be competent and productive in post-school settings and occupations (El Hassan, 2008; Green, Hammer, & Star, 2009; Moss, 2003). Studies have found that college undergraduates are far more focused on career and life preparation than mastery of subject matter or discipline content (Myers, 2008; Voss & Gruber, 2006). When viewed as career and life preparation, education is a means to prepare students for the future. Centering learning on learning tasks that are based on professional practice allows knowledge and its application to be combined in meaningful ways. Benefits from this approach may include increased transfer of learning and increased students SDL skills.

The first benefit of centering learning on learning tasks is increased learning transfer. Learning transfer refers to the impact that learning in one context has on performance of skills in a different context (Perkins & Salomon, 1994). Two types of transfer are differentiated; transfer based on identical elements of tasks performed in education and those performed outside of education (Associationist transfer), and transfer that occurs as a result of repeated experience with tasks and student reflection about these tasks (Gestalt transfer) (Van Merriënboer & Kester, 2008). Both can be supported through learning activities that are based in professional practice as learners associate identical elements from learning tasks to professional practice, and as learners reflect upon their experiences with multiple learning tasks (Van Merriënboer & Kester, 2008; Van Merriënboer & Kirschner, 2007).

The second benefit of centering learning on learning tasks is student SDL skills practice. Students may be required to practice important SDL skills as they combine subject matter knowledge and its application to complete learning tasks. As students engage in learning tasks, they may be required to do such SDL activities as the following: (a) choosing a learning path; (b) finding, evaluating, and applying information to complete tasks and solve problems (Bolhuis, 2003; Candy, 1991); (c) monitoring and adjusting personal learning as needed (Butler & Winne, 1995; Garrison, 1997); and (d) determining ways in which personal performance should be improved (Bolhuis, 2003; Van Merriënboer & Sluijsmans, 2009).

In addition to these connections between learning tasks, learning transfer, and SDL skill practice, research and theory support the role of learning tasks in fostering SDL skills.

Conceptual connections have been made between regulation of one's own learning processes and learning tasks that provide problem-solving and experimentation activities (Mayer, 1998; Winne, 1997). For instance, Winne hypothesizes that students will "bootstrap" SRL skills from experiences in which they are engaged in goal-directed learning tasks. Conceptual and empirical connections have also been made in the literature from the implementation of problem-based and task-centered learning to self-direction (Gurses, Acikyildiz, Dogar, & Sozbilir, 2007; Hung, Jonassen, & Liu, 2008; Stewart, 2007; Van Merriënboer & Kester, 2008).

Empirical studies have also connected the use of learning tasks to student increases in self-direction. Woods (1996) found that student self-perception of SDL ability increased over time in a problem-based learning environment. Blumberg and Michael (1992) implemented a partially teacher directed and problem-based curriculum and observed increases in students' SDL activities as measured by library circulation data, program evaluations, and self-reports. Sungur and Tekkaya (2006) found that a problem-based learning environment enhances SRL skills more than a traditional lecture based environment. Findings from these studies support the hypothesis that centering learning on realistic tasks or problems provides an environment in which skills for SDL can increase.

In review, the four principles are as follows: (a) Match the level of self-directed learning required in educational to student readiness; (b) progress from teacher to student direction of learning over time; (c) support the acquisition of subject matter knowledge and self-directed learning skills together; and (d) have students practice self-directed learning in the context of learning tasks. These four principles can be used by teachers in formal educational environments as guidance in providing learning experiences to foster students' SDL skills.

CONCLUSION

National reports, career mobility data, differences between learning in school and learning outside of school, and a proliferation of information suggest a need for new types of learning within education to better prepare graduates for post-educational situations. Future graduates will face job changes prompting the need for SDL skills to stay current. In SDL activities, learners will use learning skills that are different from those typically used in education. Graduates will need to be able to continually adapt to new situations by finding and using information effectively to perform tasks.

This paper reviewed the self-directed and self-regulated learning literature for prescriptive principles in fostering SDL skills. These principles focus on what teachers can do to give students opportunities to practice SDL skills within formal educational environments. The four principles are these: (a) Match the level of self-directed learning required in educational activities to student readiness; (b) progress from teacher to student direction of learning over time; (c) support the acquisition of subject matter knowledge and self-directed learning skills together; and (d) have students practice self-directed learning in the context

of learning tasks. It is hoped that these four principles for fostering self-directed learning skills can guide the design of teaching and learning activities in educational settings.

Future research is suggested to determine if, taken together, the implementation of the four principles for fostering SDL skills consistently leads to a more self-directed student. Measurements of this approach could use a pre- and post-measurement on an instrument that measures self-direction or SDL skills to determine changes over time among students (see for example, Dynan et al., 2008; Gabrielle et al., 2006).

As we continue our move into this relatively new century, SDL skills are likely to become important to graduates in a world of changing careers and practices. It may be that, at present, we are creating "good students" who are only able to acquire knowledge in structured situations with well-defined requirements. Instead, we can prepare students to be "intelligent engineers" who have knowledge, who know how and when to independently acquire more knowledge, and who know how to use and apply knowledge to accomplish useful tasks.

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A CROSS-CULTURAL STUDY OF SELF-DIRECTED LEARNING READINESS, PERFORMANCE, CREATIVITY, AND PROBLEM-SOLVING IN A SAMPLE FROM PORTUGAL

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This research explored self-directed learning readiness in a cross-cultural perspective, comparing some of the important findings of previous North American research to similar data from top companies in Portugal. A correlational research design was implemented with a sample of 145 managers and non-managers of top Portuguese companies. The results obtained replicated previous significant associations of self-directed learning readiness with performance level and with reported creativity and problem solving abilities required in the work context. Educational level was significantly associated with SDLRS scores; age and gender were not. The findings are discussed in the context of knowledge societies, cross-cultural challenges, learning organizations, and the guidelines of the European Commission.

The changing environments and complex societies in which we live today place huge demands on human beings, institutions, and organizations. This creates a mandate for quality training systems, innovative learning approaches, and a high capacity of the individual to be involved in ongoing learning. In this context, the lifelong learning paradigm is increasingly relevant to meeting the development and training needs that confront us all, and which will certainly feature even more prominently in the years to come (Bedard, 1997; Guglielmino & Guglielmino, 1994a, 2008; Zomorrodian, 1998). The exponential growth in the production of new knowledge in all learning and working domains, the technological advances (notably information and communication technology), and the changes, not only rapid but simultaneously deep and global, that are a feature of the world today (Beck, 1992) are the main forces driving the need to actively foster readiness for self-directed learning (Carré, 1997; Jarvis, 2001; Metzger, 1997; Oliveira, 2005).

In the business world, due to increasing global competition and the growth in international business, additional demands for learning and problem-solving are being placed on training design and delivery to keep pace with learning needs (Guglielmino & Guglielmino, 2006). At the same time, given increasing globalization, there is the need to foster more intercultural research. There is a consistent realization, not only in the U.S. but also in Europe, that traditional forms of training delivery must be transformed to become much

more open and flexible (European Commission, 2001; Guglielmino & Guglielmino, 2006). For example, to achieve the Lisbon political aim of a knowledge-based society, the European Union has strategically emphasized the need to promote a learning culture by, among other strategies, valuing and rewarding learning, raising awareness of its benefits, and explicitly asserting that "enterprises should be facilitated to become learning organizations, where everyone learns and develops through the work context, for the benefit of themselves, each other and the whole organization" (European Commission, 2001, p. 14).

Although many methods of innovative pedagogy could be identified, such as work-based learning, project oriented learning, and learning organized as study circles, which are recommended by the European Commission (2001), a crucial element in a learning organization is the need "to foster the development of skills and attitudes underlying self-direction in learning and to provide support structures to enable [employees] to learn efficiently and effectively" (Guglielmino & Guglielmino, 2008, p. 294). According to Zomorrodian (1998, p. 227), the concept of self-directed learning "constitutes one of the main pillars of the emerging learning paradigm," an opinion shared by many other distinguished educators for whom self-directed learning is becoming the educational and training paradigm of post-modern economies (e.g., Bedard, 1997; Brockett & Hiemstra, 1991; Candy, 1991; Carré, 1997, 2000; Costa & Liebmann, 1997; Figueiredo, 2001; Guglielmino & Guglielmino, 2006, 2008; Hiemstra, 1996a; Long, 1999; Oliveira & Simões, 2006; Papert, 2001; Straka, 1997). This approach to education is extremely versatile and has been investigated and applied in a variety of learning contexts (formal, non-formal, and informal) with great success (Knowles & Associates, 1990; Oliveira & Simões, 2006; Guglielmino & Guglielmino; 2008), targeting learners of all ages and educational levels.

The conceptualization of this phenomenon has given rise to countless theoretical discussions, and we are still far from reaching a definition capable of broad consensus (Guglielmino & Guglielmino, 2008; Long, 2000; Oliveira, 2005; Reio & Davis, 2005). For example, Hiemstra (1996b), searching systematically for acronyms, concepts, and terms linked to self-directed learning, found no less than 247 different terms. There are, however, key dimensions in the construct on which the specialists largely agree. These concern conceiving self-directed learning as a *learning process* that is chiefly managed and controlled by the individual, who assumes responsibility and is the main driving force for its planning, accomplishment, and evaluation. Readiness for this type of learning is viewed as an *individual attribute* or *personality characteristic*, which individuals possess to varying degrees and which predisposes them to involvement in self-directed learning activities (Brockett & Hiemstra, 1991; Candy, 1991; Guglielmino, 1977; Guglielmino & Klatt, 1994; Hiemstra, 1996a; Knowles, 1980; Oddi, 1984; Oliveira, 2005).

Previous research findings have identified many characteristics and attitudes of the self-directed person that are of great value to help move an organization forward. A profile of the individual with high self-directed learning skills would include the tendency to be proactive, goal-oriented, resourceful, self-disciplined, competent, self-initiating, and

resilient in the face of obstacles and adversities (Candy, 1991; Guglielmino, 1977; Oliveira, 2005). Adding to these tendencies, in the context of the workforce, Guglielmino and Guglielmino (2008) assert that while the self-directed learner is likely to "select relevant training sessions, he or she will also be likely to do an Internet search, to analyze competitors' products or services, to discuss problems, issues, and ideas with co-workers and others, to seek out experts, to experiment, to reflect on better ways to accomplish the work" (p. 295).

Many research findings demonstrate a significant relationship between readiness for self-directed learning, as measured by the *Self-Directed Learning Readiness Scale* (*SDLRS*), and important aspects of work. SDLRS scores have been significantly associated with performance levels (Durr, 1992; Guglielmino & Guglielmino, 1994b; Guglielmino, Guglielmino & Long, 1987; Roberts, 1986), particularly in jobs involving high degrees of change or requiring creativity and problem solving abilities (Durr, 1992; Guglielmino, Guglielmino & Long, 1987), and with cross-cultural adaptability (Chuprina & Durr, 2006; Guglielmino & Guglielmino, 1994b, 2008). There is also a positive association between level of management and SDLRS scores (Durr, 1992; Roberts, 1986).

As managers and other employees need to be better prepared to work in other countries due to the globalization of business and industry, and as evidence continues to support the enormous potential usefulness of the ideas and practices of self-directed learning across cultures, there is a need to continue the exploration of self-directed learning readiness of managers and non-managers in a variety of cultures. Additionally, since the positive relationships between self-directed learning readiness and performance and levels of management have been found in the U.S, it is important to see if the same results are obtained in other countries with lower individualism scores (Hofstede, 1980) and per capita income, as is the case of Portugal. This research is especially vital in Portugal; as a member of the European Union, Portugal is strongly committed to participate in building a knowledge society, following the directives of the European Commission (2006), which assert that "Europe's key economic challenge is to raise its growth and employment performance while preserving social cohesion" (p. 3).

The present empirical study aims mainly to identify the self-directed learning readiness of managers and non-managers of the top companies in business and industry in Portugal, so that these could be compared with the scores found in previous investigations. At the same time, it intends to explore the relationships between SDLRS scores and performance, as well as with levels of management, and with degrees of change, creativity and problem-solving skills required by the jobs. We will also relate the self-directed learning readiness with socio-demographic variables such as age group, educational level, and gender.

The following hypotheses were tested on the Portuguese sample:

1. Professionals of the top business and industry companies with high performance levels tend to have above average SDLRS scores.

2. Managers in top business and industry companies tend to have higher levels of self-directed learning readiness than non-managers in the same companies.
3. The *SDLRS* scores of managers and non-managers are positively and significantly associated with the perception of degrees of creativity required by their jobs.
4. The managers and non-managers whose jobs are perceived to require high levels of problem solving skills tend to manifest significantly higher SDLRS scores than the remainder of the sample.
5. The managers and non-managers whose jobs are perceived to confront them with high degrees of change tend to manifest significantly higher SDLRS scores than the remainder of the sample.
6. Self-directed learning readiness is significantly related to the socio-demographic factors of educational level, age, and gender.

METHOD

In order to achieve the main goals of the study and to test the hypotheses mentioned, a non-experimental, correlational research design was implemented.

Participants

The study sample included 145 professionals, the majority of them from the most profitable companies in Portugal in the business and industry sectors. Ninety-nine (68.3 %) were managers representing four levels of management detailed in Table 1; 46 (31.7 %) were non-managers.

Table 1. Managerial Status of Sample

Category		*Number and %*
Total Non-managers		46 (31.7%)
Managers		
Level	Description	Number
1	top managers	16
2	department managers	46
3	section managers	25
4	team managers	12
Total Managers		99 (68.3%)

Of these participants, 63 (43.4%) were male and 82 (56.6%) were female. Two-thirds of the participants (66.9 %) were between the ages of 25 and 45. Most held a master's degree. Table 2 summarizes the distribution of the socio-demographic variables of the sample by managers and non-managers.

Table 2. Summary of the Sample Characteristics, Cross-Referencing Managerial Status with Socio-demographic Variables

		Managers	*Non-Managers*	*Total*
Gender	Male	47	16	63
	Female	52	30	82
Age[a]	Under 25	1	2	3
	25-35	22	22	44
	36-45	39	14	53
	46-55	28	7	35
	56-65	9	1	10
Education	Elementary school	0	3	3
	High school	10	11	21
	Bachelor's	5	4	9
	Graduate/master's	82	28	110
	Doctoral degree	2	0	2

[a] Some participants did not provide their ages.

Instruments

The participants responded to a Portuguese version of the Self-Directed Learning Readiness Scale (SDLRS) (Guglielmino, 1977). It is a self-report inventory designed to assess a complex of characteristics (abilities, attitudes, and perceptions) supportive of self-directed learning. The instrument contains 58 items with a five-point Likert scale. Previous Portuguese validation studies with higher education students showed a Cronbach alpha of .91 (Oliveira & Simões, 2006; Oliveira, 2002, 2005), much the same as U. S. research (Guglielmino, 1997). In this particular empirical investigation the Cronbach alpha was .894.

In addition to items related to socio-demographic variables, the questionnaire also gathered information about other critical variables for this study such as level of management, last performance rating, level of change in the job, and levels of creativity and problem solving ability required for the job.

Data Collection

Based upon a list of the top 1000 most profitable companies in Portugal, disclosed by a well-known national newspaper (*Jornal de Notícias*), 120 were selected randomly and the respective management boards were contacted by telephone. After explaining the purpose of the study and assuring the confidentiality of responses, the authors asked for at least two workers in each company to answer the online questionnaire (one manager and one non-

manager). The contacts began in December, 2008. Initially the companies showed low availability to participate due to the international financial crisis. In June, 2009 a follow-up request was made to the companies that had not responded. In total, 71 companies participated in the study, answering 145 questionnaires.

RESULTS

Descriptive Statistics

As can be seen in Table 3, the SDLRS scores tended to be normally distributed, with a mean of 228 and a standard deviation of 19.57.

Table 3. Descriptive Statistics of the *SDLRS* Scores, Portuguese Managers and Non-Managers Sample ($N = 145$)

Minimum	*Maximum*	*Mean (M)*	*Standard Deviation*	*Skewness*
171	278	228.22	19.57	.014

Inferential Statistics

In order to test the hypotheses, one-way analyses of variance were used as well as the *t* test. In some cases it was necessary to collapse data due to the low frequencies registered in some categories. Post hoc tests were used where appropriate. For all tests, the level of significance chosen was 0.05 or below. The results are presented below for each hypothesis.

Hypothesis 1: Professionals of the Top Business and Industry Companies with High Performance Levels Tend to have Above Average SDLRS Scores
The ANOVA was significant ($F_{(3,141)} = 3.522$, $p = .017$). The Tukey post hoc tests revealed a significant difference ($p = .020$) between the outstanding ($n = 16$, *SDLRS* mean = 238.19) and satisfactory ($n = 22$, SDLRS mean = 219.82) ratings. The *SDLRS* mean for those rated as more than satisfactory was 229.53 ($n = 91$). The other sample participants did not know their ratings ($n = 16$). Although there are some limitations due to the sample size, the hypothesis was validated, meaning that high performers in the workplace do tend to have a higher level of self-directed learning readiness.

Hypothesis 2: *Managers in Top Business and Industry Companies Tend to have Higher Levels of Self-Directed Learning Readiness than Non-Managers in the Same Companies*
No significant difference was found in SDLRS scores between the two groups ($F_{(1,143)} = 1.142$, $p = .287$). Since top managers had the highest mean score (235.88, $n = 16$), another ANOVA was run to determine if there were differences by management levels. The result was not significant ($F_{(3,95)} = .685$, $p = .563$). Table 4 displays the data.

Table 4. SDLRS Scores by Management Level

Management Level	*n*	*SDLRS Score*
Top managers (first level)	16	235.88
Second level	46	228.35
Third level	25	227.68
Fourth level	12	228.42

Hypothesis 3: The SDLRS Scores of Managers and Non-Managers are Positively and Significantly Associated with the Perception of Degree of Creativity Required by the Job
The research results sustain this hypothesis ($F_{(2,137)} = 7.718$, $p = .001$). The post hoc tests showed a significant difference ($p = .001$) between the SDLRS scores of those reporting a very high level of creativity required in their jobs ($n = 14$, SDLRS mean = 240.31) and those reporting a moderate level ($n = 50$, SDLRS mean = 220.66), as well as between those who reported a high level of creativity required ($n = 74$, SDLRS mean = 230.15) and a moderate level ($p = .018$). Low and very low levels of creativity were excluded from the analyses because fewer than three participants selected these categories.

Hypothesis 4: The Managers and Non-Managers Whose Jobs are Perceived to Require High Levels of Problem Solving Skills Tend to Manifest Significantly Higher SDLRS Scores Than the Remainder of the Sample
The differences in SDLRS scores of those reporting different levels of problem-solving needed in their jobs were not significant for this sample ($F_{(2,140)} = 1.96$, $p = .145$). The participants with jobs requiring a very high level of problem solving abilities ($n = 43$) had an SDLRS score mean of 233.21, N=43); those reporting a high level ($n = 77$) had a mean of 226.23; those reporting a moderate level ($n = 23$) had a mean of 225.87. Those reporting low and very low levels of problem solving abilities were excluded from the analyses because fewer than three participants selected these categories.

Hypothesis 5: The Managers and Non-Managers Whose Jobs are Perceived to Confront Them with High Degrees of Change Tend to Manifest Significantly Higher SDLRS Scores
No significant association between perceived degrees of change in the job and SDLRS scores was found in this sample ($F_{(3,139)} = 1.858$, $p = .140$). The SDLRS means for the different subgroups were as follows: Very high level of perceived change in the job, mean 239.68, $n = 9$; high level of perceived change in the job, mean 228.69, $n = 62$; moderate level of perceived change in the job, mean 227.97, $n = 59$; low level of perceived change in the job, mean 219.77, $n = 13$). The participants that reported very low levels of change in the job were not included in the analyses because there were only two.

Hypothesis 6: *Self-Directed Learning Readiness is Significantly Related to the Socio-Demographic Variables of Educational Level, Age, and Gender*
Testing for the hypotheses relating self-directed learning readiness with socio-demographic variables revealed a significant difference for educational level but no significant difference by age or gender. The significant difference by educational level ($F_{(1,143)} = 6.669$, $p = .011$)

resulted from the comparison of two levels (non-college and college education), once some categories were collapsed due to very low cases. The majority of the sample participants had a graduate degree (n = 112). As was hypothesized regarding age, the analysis of variance showed a non-significant difference ($F_{(4,140)}$ = .282, p = .889) meaning that the SDLRS scores in the age categories are very similar. The SDLRS means of the subgroups ranged only between 226.17 and 229.63. The hypothesized result of non-significant difference was also supported when the relationship of SDLRS scores and gender was examined ($F_{(1,143)}$ = .244, p = .622). The SDLRS mean for males was 227.30 (n = 63); the mean for females was 228.93 (n = 82).

CONCLUSIONS AND DISCUSSION

The first objective of this study was to assess the *SDLRS* scores of Portuguese managers and non-managers in order to contribute to the exploration of the concept and practices of self-directed learning across cultures (Guglielmino & Guglielmino, 2006). The *SDLRS* mean of business and industry managers and non-managers in Portugal (M = 228) was above the general population mean (United States and Canada, M = 214) but lower than those of studies with business and industry professionals in the U. S. (e.g., Guglielmino & Guglielmino, 2006, M = 238). However, it is worth noting that the small sample size compared to the North America studies could to a certain extent compromise the comparisons. In addition, some of the studies in North America included only top managers (Guglielmino, 1996, M = 257.8) or top entrepreneurs (Guglielmino & Klatt, 1994, M = 248.6). Although the sample for this study was obtained from the top companies in Portugal, very few first level managers chose to respond (n = 16).

Nevertheless, with some limitations that only future research can help clarify, the different results in the *SDLRS* means appear to point to some cultural differences. In addition, they are congruent with previous findings of lower SDLRS means in cross-cultural studies (Guglielmino & Guglielmino, 2006) being aligned with higher levels of power distance as defined by Hofstede (1980), lower levels of individualism as defined by Hofstede, and lower levels of gross national income (GNI) per capita. Table 5 displays the data.

Until recently, in spite of many political reforms to improve the national training system, Portugal still has many workers with low qualifications. In addition, our educational system seemed to discover the needed energies and instruments to liberate itself from a long past of traditional pedagogy dominance only in the last few years. Because of this, educational establishments failed to prepare Portuguese learners to meet the requirements of a knowledge society, and did not adequately prepare students with skills suited to real working contexts nor to the necessary development of self-directed learning competencies. Fortunately, mainly due to the strategic goal set by the Lisbon European Council (2000) to transform the European Union into the most competitive and dynamic knowledge-based society in the world, Portugal is now making many positive changes, improving the quality of formal, non-formal, and informal education and making it more interchangeable in order

to promote a culture in which learning and education are valued and rewarded and where self-directed learning approaches are increasingly attracting interest.

Table 5. Comparison of Portuguese and U. S. Data: SDLRS Scores of Business Samples, GNIPC, Power Distance, and Individualism

	SDLRS (Business Sample)	*GNIPC*[a]	*Power Distance*[b]	*Individualism*[c]
Portugal (N =145)	228.22	$19,949	60 (high)	21 (low)
U. S. (N = 1706)	238.00[d]	$41,557	40 (medium)	91 (high)

[a] Figures from Nations Online (2010) representing gross national income per capita at purchasing power parity

[b, c] Hofstede (1980)

[d] Taken from a compilation of four U. S. Studies of managers and non-managers (Guglielmino & Guglielmino, 2006)

Most of the findings of this replication in a Portuguese sample of an examination of the important associations between *SDLRS* scores and several characteristics and attitudes fundamental for successfully dealing with increasing levels of uncertainty, complexity and change were very consistent with those of the North American studies. This outcome supports the contention that self-directed learning has much to offer in a cross-cultural perspective. It offers an enormous potential to help companies, conceived as learning organizations, to move forward; not only in North America, but also in different cultures. These results also support the relevance of self-directed learning construct in a broader context.

They point to the urgent need to change teaching and learning methods in formal education as well as, in the same line of reasoning, to transform the traditional forms of training delivery, stressing innovative pedagogy as recommended by the European Commission (2001). More than ever, there is the need to enhance learners' and workers' proactivity and help them be able to take more responsibility for the management of their own learning. This shift of responsibility should not mean, however, that the student or worker is abandoned; on the contrary, it is fundamental to provide learning resources and support structures. It is necessary to staff learning resource centers, or the like, with trained facilitators to assist workers in developing self-directed learning competence; and these support systems must be embedded in "a culture of self-directed learning within the organization, which requires commitment all the way to the top (Guglielmino & Guglielmino, 2008, p. 298).

Examining the specific findings of this study, we found empirical validation for the association between SDLRS scores and *levels of performance* (hypothesis 1) (p = .017),

creativity (hypothesis 3) *($p < .001$) and level of education* (hypothesis 6) *($p = .011$)*. The higher the performance, creativity required on the job, and level of education of the business and industry professionals, the higher their readiness for self-directed learning was. Age and gender were not significantly related to self-directed learning readiness. These results replicate those of the American studies (e.g., Durr, 1992; Guglielmino, Guglielmino & Long, 1987; Roberts, 1986) and also strongly validate the relevance of the construct in the Portuguese culture. At the same time, they reaffirm the importance of the construct in helping to cope with the demands for learning, problem-solving, and the ever more complex situations and growing uncertainties that all of us are increasingly facing in the post-modern societies, which Beck (1992) called risk societies.

It was not possible to support the hypothesis concerning the differences between managers and non-managers in SDLRS scores ($p = .287$); however, we believe that this result was due to the small sample size of the study and the relatively small number of top level managers who participated. A similar outcome occurred in the AT&T study conducted by Guglielmino and Guglielmino (Guglielmino, Guglielmino & Long, 1987); but significant differences by management level were found in both the Durr (1992) and Roberts (1986) replications, in which a strong effort was made to attain a more equitable number of top managers. The same reasoning can be offered to explain the absence of significant results regarding the association of the SDLRS scores with levels of problem solving ability (hypothesis 4, $p = .145$) and with degree of change confronting the professionals (hypothesis 5, $p = .140$).

The significant relationship between self-directed learning readiness and educational level ($p = .011$) is consistent with previous investigations (Bryan & Schultz, 1995; Confessore & Confessore, 1994; Long & Stubblefield, 1994; McCune, Guglielmino, & Garcia, 1990; Oliveira & Simões, 2006). When we consider formal education in its multiple levels, it reveals a significant impact on the learner self-directedness. Formal education (particularly its advanced forms) seems to be a critical factor to develop cognitive and metacognitive abilities or to promote epistemological development (Hofer & Pintrich, 1997; King & Kitchener, 1994, 2004), which is so important to a good performance in our societies. An earlier Portuguese study with a large spectrum of university students and a high level of control revealed a significant indirect effect on learner self-directedness through epistemological beliefs (Oliveira & Simões, 2006).

No significant relationship was found in this study between SDLRS scores and age ($p = .889$). Although several studies have reported a significant association between the two variables (e.g., Guglielmino, Mazmanian, Guglielmino, Hoban, & Pololi, 2002; Hoban & Sersland, 2000; Jones, 1992; Long & Stubblefield, 1994; McCune, Guglielmino & Garcia, 1990; Morris, 1997; Reio & Davis, 2005), the effect size tends to be low; and when controlled for education, its significance seems to disappear (Oliveira & Simões, 2006). Although there was no significant relationship in this study of a Portuguese business and industry sample, since there are some inconsistencies in results the relationship needs to be further explored.

The finding of no significant association between gender and self-directed learning readiness (p = .622) is consistent with the majority of studies that have explored such a relationship (e.g., Bryan & Schultz, 1995; Cheong, Lee & Long, 1995; Guglielmino et al., 2002; Hoban & Sersland, 1999, 2000; Long & Stubblefield, 1994; Oliveira, 2005; Reio & Davis, 2005).

To conclude, we should reaffirm the limitations of this study, mainly those related to the low sample size that we strongly believe have affected the inability to support some hypotheses. However, not only because of the limitations mentioned, but also because of the enormous potential of the self-directed learning construct to set the foundation for building an efficient learning culture in organizations, we recommend further study, both in Portugal and in other countries.

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Research work financed by the Centro de Psicopedagogia from the University of Coimbra (FEDER/POCI2010-SFA-160-490)

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