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Engineering and Science Faculty Students Perceptions Regarding Learner Autonomy

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ABSTRACT

The objective of the current study is to investigate the autonomy of learners among engineering and science students at the Hashemite University in Jordan and to define whether there are statistically significant differences in the levels of learner autonomy due to variables of gender, faculty, and academic level. The participants of the current study consisted of 433 undergraduate students at the Hashemite University, the dual-faculty sample was chosen using the purposive sampling method, and the Autonomous Learning Scale(ALS) was also used. The results of the study showed that the level of learner autonomy was medium, and found no statistically significant differences in the level of academic self-efficacy attributed to students' gender and academic level. However, the results of the study showed statistically significant differences in the levels of learner autonomy attributed to students' faculty in favor of science students.

Keywords: Engineering students, science students, learner autonomy.

INTRODUCTION

The phrase 'learner autonomy' was first used by Holec (1981) concerning adult education and extended learning throughout life. It referred to the learner's ability to accept responsibility for his own learning, but later on and specifically in the context of education, the term started to be used in conjunction with the autonomy perspective. The question was how to engage learners in the learning process in a way that permits them to develop the necessary qualities? Holec (2009) appeared to provide the answer as he defined learner behavior in an autonomous learning concept as follows: define objectives, contents and progressions, select methods and techniques, monitor attainment methods, and assess what has been gained. Evidently then, there are three distinct stages of autonomous learning: planning, performance, and evaluation. The learner is obligated to act autonomously during

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this process; consequently, active learner involvement becomes a dynamic progression (Oxford, 2015; Tassinari, 2010).

In their self-determination theory, Deci and Ryan (2000) include autonomy, together with competence and relatedness, as one of the three essentials vital for healthy psychological function.Similarly, autonomy is an essential component of healthy functioning in an educational setting, not simply as behavior but rather as a vital sense of freedom which, in an educational context, signifies acceptance of responsibility.

Several researchers have proposed their descriptions of autonomy. While O'Donnell, Chang, and Miller (2013) explained it as feeling in control of one's destiny, Little (1995) described learner autonomy as accepting responsibility for one's own learning, and he expanded this definition with; autonomy as the psychological relation for our own learning, while learner autonomy is seen as within the concept of universal cognition (Little, 2012). Also Littlewood (1999) stated responsibility as a key dimension of learner autonomy.

Candy (1991) also indicates that autonomy is not an end product, but a process that one works toward rather than becoming wholly autonomous. Zou (2011) concludes from this that the struggle towards autonomy is a never-ending one, a nature-oriented process rather than product-focused, adding that although students will never reach ultimate autonomy it is vital that they are helped to gain an insightful understanding of learner autonomy, while consolidating their learning experience through personal reflection, sharing and mutual discussion and contemplation, and finally, comprehend the impact of these factors on those processes. Kohonen (2012) defines autonomy development as a holistic approach in which the learner is considered as a whole person, a dedicated individual with a distinct identity. Autonomy and being naturally active in one's learning are equal partners, whereby learners have the capability to assume responsibility for their own learning. These learners have therefore rejected the notion of passive learning and consequently do not limit learning to the classroom, but are aware that learning is a continual process without boundaries. We may conclude that individuals have inherent attitudes towards autonomy and abilities that can be nurtured and developed.

Having a sense of autonomy instills positivity in the individual, decreases vulnerability to negative influences, and develops interest and participation in school and academic achievement (O' Donnell, Chang & Miller, 2013). An important facet of understanding autonomy is to look at the way how learners construct their concept of autonomy and learning, since these ideas influence the learning outcome, depending on whether the attribution style is positive or negative, with negativity resulting in dependence, lack of confidence and failure, whereas positive attributions foster learner autonomy and the resultant confidence and success. Unfortunately, however, we see that a strong sense of learner autonomy does not automatically guarantee success if the learner's attribution style is negative, and conversely, if the learner's attribution style is positive but not supported by autonomy and personal effort, it will not result in success.

White (2003) argues that effective learner autonomy results from cooperative supervision of learning involvement, and this needs to be encouraged by persistent cooperation. Benson (2001) describes autonomy in the learning environment as the learner's extensive attitude to learning, instead of being limited to a particular process or system of teaching and learning, while Benson, Benson, and Voller (1997) specify the processes using learner autonomy.

Several studies were conducted in the field of learner autonomy, especially in Western countries, but researchers noted a lack of Arab studies in this field and there is a need to understand the perceptions of the students of faculties of scientific subjects about the concept of learner autonomy. No studies found in this particular area and this particular years on the learner autonomy concept in the Jordanian Higher Education context, therefore the purpose of

the current study was to investigate the level of learner autonomy among a sample of university students in Jordan.

Study questions

The current study aimed to answer the following questions:
Question 1: What is the level of the learner autonomy among engineering and science faculty students?
Questions 2: Are there statistically significant differences in the level of learner autonomy due to students' gender, faculty, and academic level variables?

MOTHEDOLOGY

a) Participants

The population of the current study consists of all undergraduate students in the faculties of Engineering and Science at the Hashemite University in Jordan during the academic year 2018-2019, while the study sample consists of 433 undergraduate students chosen by random selection. Table 1 shows the distribution of the study sample according to the study variables.

Table 1. *Distribution of the study sample according to the study variables*

Variable	Level	Frequency	Percentage
Gender	Male	173	40%
	Female	260	60%
	Total	433	100%
Faculty	Engineering	222	51.3%
	Science	211	48.7%
	Total	433	100%
Academic level	First year	95	21.9%
	Second year	112	25.9%
	Third year	125	28.9%
	Fourth year	101	23.3%
	Total	433	100%

Of these students, 222(51.3%) were from the Engineering faculty and 211(48.7%) Science faculty; in total there were 173(40%) male students and 260(60%) female students; 95(21.9%) first year, 112(25.9%) second year, 125(28.9%) third year and 101(23.3%) fourth year. The sample ages ranged from 18-22 years.

b) Instrument

Autonomous Learning Scale(ALS) was developed by Deregözü & Hatipoğlu (2018). Itincludes 14 items measuring three subscales for autonomous learning:(1) planning[4 items(e. g, I identify my learning needs)], (2) performing[3 items(e. g, I use sources that support my learning)] and (3) evaluating[7 items(e. g, I prepare a list of my learning objectives)]. The autonomous learning scale was scored on a five-point Likert scale ranging from (1) rarely to (5) always. Deregözü and Hatipoğlu (2018) checked the validity of scale by using Exploratory Factor Analysis. The total variance explained by the three-factor scale was 50.7%. Deregözü and Hatipoğlu(2018) checked the reliability of the scale by using the

Cronbach Alpha coefficient. In the current study, the Cronbach alpha of the scale was 0.78, the reliability of the subscale was 0.62 for planning, 0.68 for performing, and 0.77 for evaluating.

In this study, to check the validity of learner autonomy scale Arabic, Pearson correlation was used between the learner autonomy scale and subscale, as shown in table 2.

Table 2. *Pearson correlation between learner autonomy and subscale*

Variable	Planning	Performing	Evaluating	Learner autonomy
Planning	1			
Performing	0.86*	1		
Evaluating	0.87*	0.86*	1	
Learner autonomy	0.90*	0.91*	0.91*	1

(**P*= 0.01)

Table 2 showed the value Pearson correlation learner autonomy ranged between 0.90 to 0.91, and the Pearson correlation value between subscales ranged between 0.86 to 0.87. In this study, the Cronbach alpha of the learner autonomy scale was 0.79, the reliability of the subscale was 0.83 for planning, 0.86 for performing, and 0.80 for evaluating.

c) Data collection and analysis

The autonomous learning scale was translated into the Arabic language and presented to two faculty members from the Educational Psychology Department to evaluate and validate the translation. The four-course compulsory college requirement for both engineering and science faculty students were completed using the autonomous learning scale. The objectives of the study were defined for the students and assurances given that the data would be confidential and used strictly for scientific research purposes; the collected data was then entered into the computer. To achieve the objective of this study, means, standard deviation, and Three Way-ANOVA analysis were used. To determine the level of learner autonomy the following standard: (1-2.33= low, 2.34-3.66= moderate, 3-67-5= high).

RESULTS

Question 1: What is the level of the learner autonomy among engineering and science faculty students?

The mean and standard deviation were calculated for each item of learner autonomy scale, as shown in table 3.

Table 3. *Means(M) and Standard deviation(SD) for the learner autonomy items*

Planning			Performing			Evaluating		
Items	**M**	**SD**	**Items**	**M**	**SD**	**Items**	**M**	**SD**
1.	3.43	1.12	5.	3.49	1.05	8.	3.51	1.04
2.	3.53	1.04	6.	3.54	1.03	9.	3.53	1.04
3.	3.57	1.03	7.	3.57	1.02	10.	3.51	1.02
4.	3.57	1.01				11.	3.59	1.01
						12.	3.58	1.01
						13.	3.54	1.00
						14.	3.56	1.01

As shown in table 3, the highest mean score of items is number 11(M= 3.59) and item number 1 has the lowest mean (M= 3.43). To achieve this objective, illustrative statistics including means and standard deviation were used to explain the level of the learner autonomy among engineering students. Table 4 presents the means and standard deviation for the level of learner autonomy and each dimension.

Table 4. *Means(M) and standard deviation(SD) for the level of learner autonomy among engineering and science students*

Variables	**Engineering**		**Science**	
	M	**SD**	**M**	**SD**
Planning	3.41	0.84	3.65	0.99
Performing	3.44	0.85	3.63	1.01
Evaluating	3.45	0.82	3.65	1.00
Learner autonomy	3.43	0.82	3.65	0.99

The results showed the mean score of the learner autonomy among engineering students was (M= 3.43), for the planning dimension the mean score was (M= 3.41), for the performance dimension the mean score was (M= 3.44), and for the evaluation dimension the mean score was (M= 3.45).While the mean score of the level of learner autonomy among science students was (M= 3.65), for the planning dimension the mean score was (M= 3.65), for the performing dimension the mean score was (M= 3.63), and for the evaluating dimension the mean score was (M= 3.65).

Questions 2:Are there statistically significant differences in the level of the learner autonomy due to students' gender, faculty, and academic level variables?

To determine whether significant differences exist between the levels of learner autonomy according to students' gender, faculty, and academic level. Table 5 presents the mean(M) and standard deviation(SD) for each dimension.

Table 5. *Means(M), standard deviation(SD) regarding the comparison of the level of learner autonomy based on students' gender, faculty and academic level*

Variables	Level	Planning		Performing		Evaluating		Learner autonomy	
Gender	Male	3.44	0.90	3.43	0.93	3.46	0.90	3.45	0.90
	Female	3.59	0.94	3.60	0.94	3.60	0.93	3.60	0.92
Faculty	Engineering	3.41	0.84	3.44	0.85	3.45	0.82	3.43	0.82
	Science	3.65	0.99	3.63	1.01	3.65	1.00	3.65	0.99
Academic level	First year	3.47	0.87	3.54	0.90	3.50	0.88	3.50	0.87
	Second year	3.54	0.83	3.51	0.82	3.54	0.82	3.53	0.81
	Third year	3.48	1.11	3.46	1.11	3.50	1.10	3.48	1.10
	Fourth year	3.63	0.83	3.64	0.86	3.65	0.82	3.64	0.82

To determine whether significant differences exist between the levels of the learner autonomy according to students' gender, faculty, academic level variables. Table 6presents the results of the Three Way-ANOVA analysis.

Table 6. *Results of Three Way-ANOVA analysis*

Variables	Source	Sum of squares	df	Mean square	F	Sig
Planning	Gender	2.165	1	2.165	2.538	0.11
	Faculty	5.507	1	5.507	6.455	0.01
	Academic level	2.121	3	0.707	0.829	0.47
	Error	364.284	427	0.853		
	Corrected total	374.876	432			
Performing	Gender	1.709	1	1.709	1.949	0.16
	Faculty	4.992	1	4.992	5.695	0.01
	Academic level	2.793	3	0.931	1.062	0.36
	Error	374.295	427	0.877		
	Corrected total	384.091	432			
Evaluating	Gender	1.710	1	1.710	2.036	0.15
	Faculty	4.369	1	4.369	5.201	0.02
	Academic level	2.111	3	0.704	0.838	0.47
	Error	358.702	427	0.840		
	Corrected total	367.463	432			
Learner autonomy	Gender	1.834	1	1.834	2.196	0.13
	Faculty	4.815	1	4.815	5.766	0.01
	Academic level	2.195	3	0.732	0.876	0.45
	Error	356.634	427	0.835		
	Corrected total	366.040	432			

The results showed no significant differences due to students' gender in the level of the learner autonomy and for each dimension. Additionally, the results showed that there are significant differences in students' faculty in the level of learner autonomy and each dimension. For the planning dimension (F= 6.455, *P*= 0.05), science students' mean score (M= 3.65) was higher than that of engineering students (M= 3.41).For the performing dimension (F= 5.695, *P*= 0.05), science students' mean score (M= 3.63) was higher than that of engineering students (M=3.44).For the evaluating dimension (F= 5.201, *P*= 0.05), science students' mean score (M=3.65, SD= 1.00) was higher than that of engineering students (M= 3.45). And for the learner autonomy (F= 5.766, *P*= 0.05), science students' mean score (M= 3.65) was higher than that of engineering students (M= 3.43).Finally, the results showed no significant differences due to students' academic level in the level of learner autonomy and for each dimension.

DISCUSSION

The aim of the current study was to investigate the level of the learner autonomy among engineering and science students at the Hashemite University in Jordan. The study sample consisted of 433 undergraduate students during the academic year 2018-2019.

The results of the current study showed that the level of learner autonomy was medium. Students' beliefs about themselves and their learning might be based on inlaid assessment, to help them understand that their underlying beliefs can assist them to prepare for the learner autonomy. Since learner confidence goes hand-in-hand with academic achievement and is a characteristic of autonomous learners, teachers need to create a learning environment that considers effective methods of learning. Teachers further need to support and facilitate learners even when they encounter such experiences that will cause them to lose confidence and enthusiasm. The results of the current study are similar to those of previous studies by

Sijalli and Khanal (2016) who found that the level of learner autonomy for English was moderate.

O'Leary(2014), points out that although in learner-centered learning, learners are the central focus of the learning process, Takagi, (2009)comments that to promote the learner autonomy and suggests that development of this skill is better served by focusing on learner choice, reflection, and peer review.Little (2013); Farrell and Jacobs, (2010) support this view and suggest that organizing group activities, encouraging self-assessment, inspiring cooperation rather than competition and individualism, as well as providing contact with reliable, accurate texts, are the classroom contributions to promoting learner autonomy.

Thus learners, being the principal participants and contributors, are endorsed as controllers of an autonomous environment, but this situation, however, raises the following question: Can the centuries-old tradition of the teacher is the central figure in the learning process suddenly collapse? Of course, it cannot. According to Thanasoulas (2000), this change did not occur in a vacuum but is the result of a conglomeration of modifications to the core curriculum on the way to a more learner-centred style of learning. Little (2004) argues that autonomous learners are aware of the objectives of their learning program and clearly recognize the diligence required for their learning success, organize the set of learning objectives, initiate planning and executing learning activities, review their learning progress regularly as well as carrying out frequent effectiveness evaluation. Nunan (1997) agrees with the concept that an autonomous learner generates his own learning objectives and discovers the learning strategy which he finds most successful.

The results illustrated significant differences in learner autonomy between students of the engineering and science faculties in all dimensions, in favour of the science faculty students, who rated higher than the engineering faculty students in correcting mistakes, ensuring accuracy, planning the course, setting objectives of the course, deciding on the course content, activities, and evaluating the course.

However, the results showed no significant differences in the learner autonomy levels due to gender or academic level, in any dimension. This result may be attributed to university students having the ability of time management, using deep learning styles, self-esteem, and motivation which are characteristics of autonomous learning, regardless of their gender and academic level.

Sijalli, and Khanal (2016) found statistically significant differences in the levels of learner autonomy in terms of gender, with the female students being less autonomous than male students; they also found significant differences in the levels of learner autonomy in terms of faculty that the English language teaching students from management. Varol and Yilmaz (2010) found no significant difference in the level of learner autonomy in terms of gender.

In light of the findings of the current study, researchers recommend that teachers encourage students to take responsibility for their learning. Future research can investigate the relationship between learner autonomy and learning styles.

REFERENCES

Benson, P. (2001). *Teaching and researching autonomy in language learning*. London: Longman.

Benson, P. and Voller, P. (1997). *Autonomy and Independence in Language Learning*, London: Longman.

Candy, P.C. (1991). *Self-direction for lifelong learning*. San Francisco: Jossey Bass.

Deci, E. L., & Ryan, R. M. (2000). The ‘what’ and ‘why’ of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268.

Deregözü, A., & Hatipoğlu, S. (2018). An investigation on prospective German language teachers‟ autonomous learning level. *Journal of Language and Linguistic Studies,* 14(1), 01-10

Farrell, T. S., & Jacobs, G. (2010). *Essentials for Successful English Language Teaching*. London: Continuum International Publishing Groups.

Holec, H. (1981). *Autonomy in foreign language learning* Oxford: Pergamon Press (First published 1979, Strasbourg: Council of Europe)

Holec, H. (2009). Autonomy in language learning: A single pedagogical paradigm or two. In F. Kjisik, P.Voller, N. Aoki & Y. Nakata (Eds.) *Mapping the terrain of learner autonomy: Learning environments, learning communities and identities* (pp.21-47). Tampere: Tampere University Press.

Kohonen,V.(2012). Developing autonomy through ELP-oriented pedagogy: Exploring the interplay of the shallow and deep structures in a major change within language education. In B. Kühn and M. L. Pérez Cavana (Eds.), *Perspectives from the European Language Portfolio: Learner autonomy and self-assessment* (pp. 22-42). New York, NY: Routledge.

Little, D. (1995). Learning as dialogue: The dependence of learner autonomy on teacher autonomy. *System*, 23(2), 175-182.

Little, D. (2004, March). *Learner autonomy, teacher autonomy and the European Language Portfolio*. Paper presented in UNTELE, University de Compiegne, Compiegne, France.

Little, D. (2012). The European Language Portfolio: History, key concerns, future prospects. In B.Kühn and M. L. Pérez Cavana (Eds.), *Perspectives from the European Language Portfolio: Learner autonomy and self-assessment* (pp. 22-42). New York, NY: Routledge.

Little, D. (2013). Responding Authentically to Authentic Texts: A Problem for Self-access Language Learning. In P. Benson (Ed.), *Autonomy and Independence in Language Learning* (pp.225-236) NY: Routledge

Littlewood, W. (1999). Defining and developing autonomy in East Asian contexts. *Applied Linguistics*, 20(1), 71-94

Nunan, D. (1997). Designing and adapting materials to encourage learner autonomy. In P. Benson and P.Voller (Eds., *Autonomy and independence in language learning* (pp.192-203)London: Longman

O'Donnell, S. L, Chang, K. B. & Miller, K. S. (2013). Relations among Autonomy, Attribution Style, and Happiness in College Students. *College Student Journal*, *47*(1), 228-234.

O'Leary, C. (2014). Developing Autonomous Language Learners in HE: A Social Constructivist Perspective. In G. Murray (Ed.)*Social Dimensions of Autonomy in Language Learning* (pp.15-36).Palgrave Macmillan.

Oxford, R. L. (2015). Expanded perspectives on autonomous learners *Innovation in Language Learning and Teaching*, 9(1), 58-71

Sijali, K. K., & Khanal, R. N. (2016). Learner's autonomy in learning English in context of higher secondary level education Nepal. *Language in India,* 16(5), 222-239.

Takagi, A. (2009). Promoting Learner Autonomy in a Reading Class T. Yoshida, H. Imai, Y.Nakata, A. Tajino, O. Takeuchi, & K. Tamai (Eds.), *Researching Language Teaching and Learning: An Integration of Practice and Theory* (pp.323-342) Bern International Academic Publishers/Peter Lang

Tassinari, M. G. (2010). *Autonomes Fremdsprachenlernen: Komponenten, Kompetenzen, Strategien*. Frankfurt am Main: Peter Lang Verlag.

Thanasoulas, D. (2000). 'What is learner autonomy and how can it be fostered?' *The Internet TESL Journal,* 6(11), 10.12.2014 retrieved from http://iteslj.org/Articles/Thanasoulas-Autonomy.html

White, C. (2003). *Language learning in distance education*. Cambridge: Cambridge University Press.

Varol, B., & Yilmaz, S. (2010). Similarities and Differences Between Female and Male Learners: Inside and Outside Class Autonomous Language Learning Activities. *Procedia- Social and Behavioral Sciences, 3,* 237-244.

Zou, X. (2011). What happens in different contexts and how to do learner autonomy better? *Teacher Development: An International Journal of Teachers' Professional Development*, ***15***(4), 421-433.