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Constructing of Self-Learning Assessment Tool in the University

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Abstract

Purpose: Considering the role and importance of self-learning in academic success and performance, the present study was conducted with the aim of constructing of self-learning assessment tool in the university.

Methodology: The present study in terms of applied purpose and in terms of how it was performed, it was cross-sectional. The population and sample of the research in the first part were the professors of Islamic State and Islamic Azad universities of Tehran and Gilan provinces in the academic year 2019-2010, from which 60 people were selected by multi-stage cluster sampling method. And in the second part, the students were from the same universities, from which 450 people were selected by multi-stage cluster method. Based on literature review and interviews with professors, 91 items were designed in six dimensions: Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education, and learning styles. To evaluate the face and content validity of experts, to evaluate the construct validity by exploratory factor analysis and to evaluate the reliability of Cronbach's alpha coefficients in SPSS software version 19.

Findings: The findings showed that according to experts' opinion 15 items were removed and the final form of the scale had 76 items. Also, the results of confirmatory factor analysis showed that the self-learning assessment scale in the university had six factors of Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education and learning styles that reliability through Cronbach's alpha coefficient for all factors above 0.70 and for the whole scale was 0.932.

Conclusion: According to the results of this study, the self-learning assessment scale in the university had appropriate psychometric indices and can be used as a suitable and valid tool in other studies to assess self-learning.

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1. Introduction

The period of study at university is a period of life in which extensive academic, cognitive and social changes occur and adaptation to these conditions and academic challenges has been considered by many researchers (Hein & et al, 2019). Today, learning is the most important issue in educational systems and represents a process in which a person's thoughts and behaviors change and any change is due to a learning stimulus (Horng & et al, 2020). One of the concerns of professors, university officials and students' families is the educational status of students and education to students is done with the aim of progress and the use of learning strategies has an effective role in it (Sayadi & et al, 2020). How to use learning strategies and time management can facilitate and accelerate the learning process. Learning and time management is one of the most important parts of learning and has an effective role in increasing the effectiveness of learning and through independence and self-direction in learning increases learning enthusiasm, intrinsic motivation and positive reorientation in learners' learning (Kang & et al, 2020) . Self-learning is one of the concepts that leads to self-direction in learning and increases mental activity, learning motivation and continuity of content in the mind (Alharbi, 2017). There are six skills for self-direction in learning, including self-assessment of learning needs, self-assessment, foresight, information management, critical thinking, and critical appraisal. Each of these skills is not used alone, but is interdependent. And all of these skills are used together to guide and control learning (Schweder & Raufelder). Students become familiar with their learning needs through self-directed learning, setting learning goals, choices and strategies, and evaluating learning outcomes, which increases learners' self-confidence and their ability to learn independently (Kumar & et al, 2021).

One of the most important concepts in learning is the Hitagogic concept of how to learn and what to teach (Green & Schlairet, 2017). Hitagogic requires the use of two-way learning, that is, the active and collaborative participation of teacher and student, emphasizes the development of capabilities in addition to competencies, and students play an effective role in designing learning (Msila & Setlhako, 2012). In self-learning, people determine their own content, but this is not done individually, but with the help of a learning system that facilitates the learning process, and in this process, self-regulatory skills are very important. Self-regulation is defined as an active and structural process by which the learner regulates and controls his / her goals, learning activities, cognition, motivation and behavior (Vosniadou & et al, 2020). Self-regulation in learning is one of the concepts that pays attention to the role of the individual in the learning process and includes cognitive learning strategies, metacognitive learning strategies and resource management strategies (Vanslambrouck & et al, 2019). Self-regulated learners are creative and responsible individuals who determine their own learning needs, learning goals, learning resources, and appropriate strategies for achieving goals (Muller & Seufert, 2018). Another important concept in the discussion of self-learning is knowledge management. Knowledge is first designed and managed in the individual mind and then in the external environment. Knowledge management is a value in the discussion of learning and facilitates and accelerates learning (Antunes & Pinheiro, 2020). Knowledge management is a process strategy in which the organization seeks to capture and organize knowledge using individuals, processes, and technology; to improve the capacity of the organization to compete and produce (Barao & et al, 2017). Another important concept is critical thinking, which can play an effective role in shaping cognitive confidence, cognitive self-awareness, a sense of need for control, and positive beliefs about thought controllability (Ceibert, 2021). Critical thinking is the ability to analyze thinking while examining how it is modified and enhanced that people need to evolve and benefit from knowledge (Hyytinen & et al, 2018). Another important component of self-learning in university is adult education, which is best done by asking questions and finding answers by adults themselves, in which case people see the world not statically, but in a visible way (Cai & Kosaka, 2019). One of the human needs today is to have a minimum literacy and literacy to access information in order to gain awareness and knowledge and have a better life, and adult education is a key factor in economic growth, career development and life skills (Young & et al, 2020).

Another important component in the discussion of self-learning is learning styles, which as a metacognitive variable refers to how the experience and learning situation are defined, the use of different strategies for learning, and the learner's underlying motivation to learn (An & Carr, 2017). There are different learning styles, and each one somehow affects how some content learns and learns better (Vilori & et al, 2019).

Although there is no tool for measuring self-learning, there are tools for measuring related concepts. For example, Oddi (1986) developed a tool for measuring self-directed learning that had 24 items in three components and reported its validity by confirmatory factor analysis, confirmation and reliability by Cronbach's alpha method of 0.80. Bartlett & Kotrlik (1999) developed another tool for measuring self-directed learning that had 49 items in eleven components and reported its validity by confirmatory factor analysis, confirmation and reliability by Cronbach's alpha method of 0.92. Fisher, et al (2001) developed another tool for measuring self-directed learning readiness, which had 40 items in three components of self-control, learning desire and self-management, and its validity was confirmed by factor analysis method and its reliability by Cronbach's alpha method for the whole. Instruments reported 0.83 and for three components were 0.80, 0.85 and 0.87, respectively. Williamson (2007) developed another tool for measuring self-directed learning in the student learning process that had 60 items in five components of knowledge, learning strategies, learning activities, evaluation and interpersonal skills and its validity was confirmed by confirmatory factor analysis. Cronbach's alpha method reported 0.90 for the whole instrument and 0.77, 0.87, 0.80, 0.89 and 0.89 for the five components, respectively. Cheng et al (2010) developed another tool for measuring self-directed learning that had 20 items and its validity was confirmed by Delphi method according to experts and its reliability was reported by Cronbach's alpha method of 0.916. The above concepts indicate the importance of self-learning and its role in academic success and performance, and studies indicate that there are many problems in educational systems, especially in the field of effective and continuous self-learning and learning. Many learners in the higher education system have a low ability to self-learn, which reduces learning and increases the likelihood of probation. Another important point is that one of the great challenges of today's society is the weakness in continuous and effective learning, and in order to achieve self-learning, it is first necessary to design a scientific and valid tool for it. In addition, due to the lack of a suitable and valid tool for measuring self-learning in the university, the provision of this tool can help other researchers to conduct research in this field and be a model for specialists and planners of educational systems, especially in higher education. As a result, the present study was conducted with the aim of constructing self-learning assessment tools in the university.

2. Methodology

The present study was applied in terms of purpose and cross-sectional in terms of implementation method. The population and sample of the research in the first part were the professors of Islamic State and Islamic Azad universities of Tehran and Gilan provinces in the academic year 2019-20, from which 60 people were selected by multi-stage cluster sampling method. Among them, 450 people were selected by multi-stage cluster sampling method. In the multi-stage cluster sampling method, first each of the provinces of Tehran and Gilan is divided into five parts: north, south, east, west and center. From each of them, three methods are randomly selected and from among the public and free universities in each part, a number of universities The method was randomly selected and finally for the selection of professors and students, a number of professors in the departments of educational sciences and psychology and students of some faculties were selected randomly after reviewing the inclusion criteria. Criteria for admission of professors include having a doctorate, at least 5 years of work experience and having an article about self-learning or related fields and criteria for admission of students including non-conditionality in previous semesters, no addiction and use of drugs and no history of stress it was like a divorce in family and close friends. Exclusion criteria for both faculty and students were reluctance to participate in the research and withdrawal from further cooperation. For the selected individuals in both sections, the purpose,

importance and necessity of the research were stated and they were reassured about the observance of ethical points.

To build a self-learning assessment tool at the university based on text review and interviews with professors, 91 items in six dimensions of Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education and learning styles were designed. The items were scored from a scale of five Likert options from one (very low) to five (very high), and a higher score indicated greater self-learning ability. Form 91 provided the tool items to the professors to check their face and content validity, at which point 15 items were removed. A 76-item form was administered to 30 students other than the sample students in the present study, and the reliability of the Cronbach's alpha method for the whole instrument was 0.895 and for the dimensions of Hitagogic ability (19 items) 0.926, self-regulation (14 items) 0.865, critical thinking (8 items) 0.737, knowledge management (4 items) 0.642, adult education (25 items) 0.789 and learning styles (6 items) 0.764. In the present study, in order to evaluate the face and content validity from the experts' point of view, the construct validity of the exploratory factor analysis method and the reliability of Cronbach's alpha coefficients in SPSS software version 19 were used.

3. Findings

Participants were 60 public and free university professors with a mean age of 42.38 years and 450 public and free university students with an average age of 22.76 years. Frequency and frequency of students' demographic information were presented in Table 1.

Table1. Frequency and percentage of students' demographic information

Attributes	Levels	Abundance	Frequency
Gender	Female	297	66
	Man	153	34
Age	25-19 years	238	52/89
	36-25 years	183	40/67
	Over 36 years	29	6/44
type of university	Governmental	119	26/44
	Private	112	24/89
	Free	196	43/56
	Payame noor	23	5/11
Grade	Bachelor	252	56
	Masters	198	44
Field of Study	Humanities	260	57/78
	Science	77	17/11
	Technical	46	10/22
	Other	67	14/89

Frequency and frequency of demographic information of students participating in the research based on gender, age, type of university, degree and field of study can be seen (Table 1). The results of mean, standard deviation, skewness and elongation of the self-learning assessment scale in the university were presented in Table 2.

Table2. Results of mean, standard deviation, skewness and elongation of the self-learning scale in university

Variables	Average	Standard deviation	skewness	Elongation
Hitagogic ability	4/34	0/61	0/104	0/223
Self-regulatory	3/24	1/43	-0/138	0/116
Critical Thinking	4/55	0/57	0/003	0/115
knowledge management	4/34	0/94	0/125	0/253
Adult Education	4/52	0/57	0/008	-0/126
Learning styles	4/52	0/51	-0/079	0/015
Total self-learning	4/25	0/77	-0/047	-0/226

The Self-Learning Scale had six dimensions: Hitagogic ability, self-regulation, knowledge management, critical thinking, adult education, and learning styles, whose descriptive indicators are observable and assumed to be normal due to skewness and elongation in the range of +1 to 1. - Approved (Table 2). The results of KMO and Bartlett indices to determine the adequacy of the sample were presented in Table 3.

Table3. Indicators for determining sample adequacy

Variables	KMO coefficient	Bartlett Statistics	Degrees of freedom	meaningful
Hitagogic ability	0/327	567/341	253	0/001
Self-regulatory	0/643	227/197	91	0/001
Critical Thinking	0/494	134/146	66	0/001
knowledge management	0/520	27/975	6	0/001
Adult Education	0/705	105/063	36	0/001
Learning styles	0/194	359/623	231	0/001

KMO and Bartlett indices indicated the adequacy of the sample for factor analysis (Table 3). The results of factor analysis to determine the amount of factor load of the items of the self-learning measurement scale in the university were presented in Table 4.

Table4. The results of factor analysis to determine the amount of factor load on the items of the self-learning scale in the university

Row	Items	Factor load	Row	Items	Factor load
1	Set learning goals	0/867	39	Reasoning skills	0/694
2	Knowing learning skills	0/581	40	Inductive reasoning skills	0/767
3	Having the right attitude to learn	0/809	41	Deductive reasoning skills	0/811
4	Appropriate learning environment	0/892	42	Attract individual knowledge	0/696
5	Positive thinking about self-learning	0/781	43	Having a store of personal knowledge	0/522
6	Feeling the need for self-learning	0/797	44	Possibility of applying individual knowledge	0/584
7	Interest in lifelong learning	0/855	45	Skills of disseminating individual knowledge	0/589
8	Commitment to your learning	0/839	46	Earn financial resources	0/844
9	Planning for self-learning	0/766	47	Emotion control skills	0/841
10	Constructive learning	0/743	48	Accepting the responsibility of self-learning	0/783
11	Ability to self-concept	0/845	49	Creating an independent identity	0/542
12	Self-learning ability	0/757	50	Self Confidence	0/826
13	Ability to research and combine results	0/824	51	Increase flexibility	0/833
14	Desire to learn	0/821	52	Participate in participatory projects	0/814
15	Self-control in learning	0/865	53	Appropriateness of learning environment	0/820
16	Self-coaching	0/821	54	learning goals	0/757
17	Self-learning management	0/871	55	Proper orientation of the master	0/887
18	Self-determination in learning	0/738	56	Provide learning experiences	0/911
19	Self-inquiry in learning	0/654	57	The fit of learning with work	0/910
20	Self-awareness	0/797	58	Constructive communication with the class	0/893
21	Manage yourself and learn	0/829	59	Proper communication with learners	0/848
22	Knowledge and information management	0/747	60	Variety in the training program	0/866
23	Understanding learning methods	0/758	61	Quality of learning content	0/923
24	Proper selection of learning resources	0/834	62	Quality of educational processes	0/869
25	Knowing learning resources	0/813	63	Flexibility in teaching methods	0/826
26	Autonomy in learning	0/747	64	Flexibility in the teaching process	0/760
27	Having a good learning pattern	0/776	65	Flexibility in homework	0/711
28	Having an internal control center	0/838	66	Respect for the learner	0/869
29	Being motivated to progress	0/808	67	Self-learning needs	0/893

30	Self-criticism skills	0/735	68	Attitude to learning	0/770
31	Self-motivation ability	0/780	69	Self-programming	0/819
32	Decision-making skills	0/829	70	Intentional learning experiences	0/836
33	Spontaneity and self-efficacy	0/909	71	Attractive learning style	0/783
34	Having analytical thinking	0/749	72	Convergent learning style	0/730
35	Mastery in decoding concepts	0/807	73	Adaptive learning style	0/910
36	Evidence-seeking skills	0/846	74	Active learning style	0/836
37	Wise guessing skills	0/791	75	Thoughtful learning style	0/844
38	Results extraction skills	0/871	76	Pragmatic learning style	0/868

The results of factor analysis showed that all 76 items had a factor load above 0.50 and therefore no item was removed (Table 4). The results of exploratory factor analysis to determine the validity of the structure and the results of reliability on the scale of self-learning in the university were presented in Table 5.

Table5. Results of exploratory factor analysis to determine the validity of the structure and the results of reliability in the scale of self-learning in the university

Variables	Number of items	Number of items	Issue validity	Reliability (Cronbach's alpha)
Hitagogic ability	19	1-19	0/758	0/917
Self-regulatory	14	20-33	0/684	0/882
Critical Thinking	8	34-41	0/620	0/750
knowledge management	4	42-45	0/613	0/729
Adult Education	25	46-70	0/736	0/834
Learning styles	6	71-76	0/725	0/811

The results of exploratory factor analysis showed that the scale of self-learning in the university had six factors or dimensions, all of which were confirmed for their validity due to being higher than 0.50 and the reliability of all of them due to being higher than 0.70. The total reliability of the scale was calculated 0.932 by Cronbach's alpha method. It should be noted that the Self-Learning Assessment Scale in the University has six dimensions of Hitagogic ability (19 items including items 1 to 19), self-regulation (14 items including items 20 to 33), knowledge management (8 items including items 34 to 41), critical thinking (4 items included items 42 to 45), adult education (25 items including items 46 to 70) and learning styles (6 items included items 71 to 76) (Table 5).

4. Discussion

Through self-knowledge and ways of learning, man tries to empower himself and find the most correct and fastest way of communication. This learning enables man to communicate effectively with the world outside the mind, thereby opening new perspectives beyond him, expanding his capabilities, and enhancing his special abilities. Self-learning has been considered by psychologists, counselors and education specialists as a new and effective strategy to help students master the learning processes and generally improve the quality of learning. Accordingly, in this study, while recognizing the dimensions and components of self-learning and its approval by educational experts, an attempt was made to prepare and examine a suitable tool for measuring self-learning while compiling the relevant components. Therefore, considering the role and importance of self-learning in the success and academic performance and career of individuals and the lack of appropriate and valid tools to measure it, the present study was conducted with the aim of constructing self-learning assessment tools in the university.

The findings of the present study showed that after reviewing the face and content validity of the self-learning assessment scale in the university by university professors, among 91 items, 15 items were removed and the final form was approved with 76 items. The results of heuristic factor analysis showed that 76 items were in six factors or dimensions of Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education and learning styles, all of which had good validity and reliability. Although no tool was found to measure self-learning, Oddi (1986), Bartlett & Kotrlik (1999), Fisher et al. (2001),

Williamson (2007), and Cheng et al. (2010) also developed valid tools for self-directed learning that It's somewhat like self-learning.

Students' self-learning has been proposed by experts as their ability to manage learning, educational leadership, and self-direction in learning abstract concepts, and helps individuals guide their inner exploration and learning. This is more evident in adults who have different learning models and styles, and helps the students' metacognition and self-regulation mechanisms to play a more purposeful role in improving learning. Educational leadership is a training method for self-directed learning that internalizes learning and creates a knowledge management cycle. Each of the components of self-learning also plays an important role in this direction. According to the results of this study, the Self-Learning Assessment Scale in the university had six factors or dimensions of Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education and learning styles, some of which were mentioned in previous studies reported above. Self-learning and dimensions and components make learners engage with educational concepts and are ready to receive, accept and analyze concepts. This allows people to have more capabilities and to be able to understand more complex learning, and as a result, these capabilities improve their academic performance and academic success.

In general, based on the results of the present study, it can be concluded that the face, content and structure validity and reliability of the self-learning measurement scale in the university and its dimensions were appropriate. In other words, the tool had six dimensions or factors of Hitagogic ability, self-regulation, critical thinking, knowledge management, adult education, and learning styles; So that it has a good evaluation capability. With the help of this tool, the quality of self-learning in students can be assessed and used as a suitable and valid basis and criterion for improving education and learning. Also, the construction of a self-learning assessment scale in the university can provide new ways to expand and conduct further research in the field of educational sciences and psychology of teaching and learning and other fields, and in addition to suggesting researchers to conduct further research and review other aspects to specialists and Education planners are advised to use this tool to better understand the characteristics of students and try to promote self-learning in them.

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