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The Extent of Applying Meta-Learning in the Professional Diploma Program to Qualify Teachers in Universities

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Abstract*—This article aimed to answer the study questions: To What extent do the postgraduate professional diploma program students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman?, Is there a statistically significant difference in student- teacher's students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman due to student major?. The student teachers responses were collected using questionnaire, and been analyzed using The Statistical Package for Social studies (SPSS/28 version) to answer the research questions. the results showed that the arithmetic averages of the study tool items on each of the questionnaire items and the total score of the items were favorable and high, with the average response on the total score being 4.20, besides the result reveals that there are not any statistically significant differences between the students teachers responses regarding the student's teachers major at the significance level 0.05, with T=1.81, with significance value of 0.07.

Key words: Meta Learning, students teachers, Professional Diploma Program.

I. INTRODUCTION

One of the mental processes that sets humans apart from other animals is thinking, which humans have engaged in since their ancestors first appeared on our planet. This is a daily activity that begins as soon as we get up and consider what to eat, what to wear, and what to do and how to accomplish it. And in the event that this endeavor is successful or unsuccessful, what outcomes will arise? To put it another way, it's the process by which we give objects and life itself meanings. The value of thinking and thinking skills is seen in how well they enable and enhance meta-learning.

Due to its significant contribution to the advancement of education and enrichment of the teaching-learning process, academic achievement is regarded by many educators in general and professional diploma specialists in particular as the center of attention. This is because academic achievement is one of the key indicators used to determine a student's level through meta-learning, which is linked to Students that possess meta-learning skills have a high ability to control learning processes, make decisions, and solve problems, which leads to good learning and academic performance.

Meta-learning skills play an important and effective role in improving the processes of understanding, attention, memory, knowledge, self-learning, and the self-will to know. Having diploma students possess meta-learning skills can contribute to increasing their awareness and awareness of the learning process and providing them with multiple skills such as planning, monitoring, evaluation, awareness, and self-questioning, and the effect of learning these skills is transferred to New learning situations [2].

In the seventies of the twentieth century, the concept of meta-learning appeared in research, and its idea was based on the fact that learning improves and grows through imitation and that the basic difference between the expert in solving problems and the less experienced is due to the awareness of thinking and meta-learning skills of each of them [20].

Meta-learning skills include planning, monitoring and evaluation. These skills relate to awareness of knowledge, controlling and organizing this knowledge, the ability to self-evaluate, make judgments about oneself, effectively monitor knowledge, distinguish between knowledge, understanding knowledge, working with it, and awareness and constant use of it [22]

Thorndike also mentioned that there are individual differences in learning, and that these differences can be embodied in terms of individual differences between individuals in environmental factors, noise level, temperature, light, etc., emotional factors, and personal and biological factors. As for learning style, it is a term used to examine and understand individual differences in learning and to study points of view. Different in how it works [29].

The diversity of learning methods is due to the fact that there is no single method that achieves the best results for all students, as a certain method is suitable for one student and is not suitable for another. William Obaid also pointed out the revolution in the educational institution's interest in teaching and learning methods with the aim of

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developing and unleashing the learner's creative energies and moving away from the culture of receiving information to the culture of constructing information, processing it and transforming it into knowledge, which is represented by discovering relationships and research phenomena that enable the transition from the stage of knowledge between the brackets of learning to the stage of learning. Meta-learning. [18].

With the emergence of micro learning, the learner was no longer able to study many long courses or read long and voluminous information. All of this led to micro learning. The first appearance of micro learning was in 2012, when it was used as a new approach in providing training and learning in the workplace [30].

The results of some studies have clarified the effectiveness of the micro-learning environment in teaching professional diploma courses in universities, through experiments targeting diploma students, which proved that the results of learning activities in developing the results of related learning and the courses that were offered [20].

Among the factors associated with viewing and interactive practices through a mobile micro-learning environment based on video viewing time is the process of meta-learning, methods for processing it, and strategies that the individual uses in generating general memory associations and long-term memory, which in turn affect the processes of encoding, retaining, and recalling information. Thus, meta-learning factors emerge as one of the variables with The relationship with mobile micro learning coming on video and the knowledge that the individual carries about his memory, its working system, its activities, awareness, its ability, and how to evaluate it leads to improving its performance and raising its efficiency in processing information through three main components: awareness, memory, and a memory tool to enable those who are able to diagnose the problems facing the memory and monitoring processes. Memory performance and awareness of appropriate strategies to improve the performance of the meta-learning process and select appropriate knowledge previews [31].

Meta-learning mechanisms add to the individual's ability to monitor and manage the content of his memory, and meta-learning was judged through various satisfaction axes, the most prominent of which are the learner's satisfaction with his memory, the ability of knowledge to perform its daily functions, and the use of memory aids [24].

It is linked to the processes of recording, storing, searching for information, and training in solving problems [1] as it directly affects the components of metacognition associated with planning, storage, and retrieval [25], [1]. Dual-processing theory indicates between processing fluency and the learner's beliefs about difficulties in remembering and knowing after exposure to the learning situation and judging his processing abilities and level of learning [32].

II. THEORETICAL LITERATURE

Meta-learning means the learner's knowledge of various aspects, such as his own knowledge system, in addition to his awareness of his previous experiences related to the processes of encoding, storing, and retrieving various information [34].

Meta-learning refers to the performance components of memory and sources of control, as well as the monitoring of cognitive activity represented by the processes of self-monitoring, evaluation, and self-regulation. In general, meta-learning skills have a major role in improving the efficiency of knowledge and improving its absorptive capacity, in addition to the fact that high rates among the learner lead to deeper... Thinking and flexibility in innovation processes, which in turn helps improve the efficiency of memorization processes and associated academic performance [35].

Meta-learning skills are skills that appear in both high- and low-intelligence learners, and they differ in how they are used in learning activities. Meta-learning skills enable learners to self-learn on the grounds that they help them gain self-awareness in their thinking and learning. It makes learning effective and active. (Hani Al-Saeed 2009). Meta-learning skills help learners focus on information related to the task to build an understanding and representation of the entire task. This enables them to design a plan of action to determine the desired goals and study the learning activities [36].

Meta-learning skills are viewed as an important component in teaching complex higher-order thinking skills and should be accommodated in teaching curricula, as meta-learning skills represent important factors in developing individuals' skills in specific topics. Perhaps one of the most important characteristics of meta-learning is that it includes a growing awareness as the individual becomes more aware of the processes of meta-learning. Thinking itself and its specific procedures and also more aware of himself as an individual [37]. Teachers must provide classrooms with activities that improve metacognitive skills, planning, monitoring, and organizing [38].

Meta-learning is a complex mental skill that is considered one of the most important components of intelligent behavior in processing information. It increases with the developmental stages of the individual on the one hand and as a result of the various experiences that the individual goes through on the other hand. It carries out the task of controlling activities directed at solving various problems while using all of the individual's cognitive abilities effectively. Facing the demands of thinking [16].

There are many classifications of meta-learning skills, but there is consensus on three basic skills, as Spearing classified meta-learning skills as planning, monitoring, and evaluation, and each skill includes sub-skills [21]. Meta-learning is considered a self-reflective tradition to become aware of cognitive processes and use this self-reflection to manage thinking, face the demands of

life, and control the psychological structures, beliefs, emotions, and behaviors that intervene in monitoring, changing, and interpreting an individual's thoughts, evaluating ideas, and then improving performance efficiency.

Jacobs & Paris (1987) defined it as thinking about thinking, that is, thinking related to the self and includes self-evaluation and self-management. Meta-learning is defined as the self-insight that the individual performs regarding his cognitive beauty, the direction of his cognitive structure, the direction of his cognitive processes, and what follows from under the control and management of these processes using skills. Metacognitive management includes planning, self-monitoring, decision-making regarding choosing the appropriate strategy, metacognitive guidance, and cognitive treatment of difficulties in progressing in performance [33].

That is, meta-learning means the individual's awareness and knowledge of his own mental processes, where he can monitor, organize, and direct to achieve the desired goals. Meta-learning is a process of self-regulation, self-monitoring behavior, practical monitoring, using effective strategies, and presenting the achievement of the goal and what the individual has learned. Meta-learning helps improve the process of students' awareness of their thinking and knowledge or controlling the application of strategies that process new information, and this awareness is evolving and ongoing. Meta-learning is considered to be higher thinking skills that an individual uses during the education process, through planning, monitoring, and evaluating this activity with the aim of directing his learning to reach the highest level [40].

The importance of meta-learning in the lives of individuals and groups has prompted many researchers and even institutions to pay attention to it, trying to understand it by identifying its elements and understanding its mechanisms with the intention of manufacturing it later. Indeed, as a result of the findings of research in this regard, the educational efforts of various educational systems in the world and at all educational levels have been directed towards one goal, which is to provide students with basic thinking skills and teach them how to think about knowledge, and this is a step forward It is important to apply it in various life situations so that learning has meaning. . This explains the continuous reconsideration of how educational activity should be approached. In light of this, global interest in the subject of meta-learning increased by workers and researchers in the educational field in the second half of the twentieth century, and this was evident through research, studies and training programs that sought to search for ways to improve the ability to think through meta-learning. The concept of meta-learning is considered One of the most important modern concepts in the field of educational psychology, the beginnings of which appeared at the hands of during the seventies of the last century, indicating that metacognition means thinking about the process of thinking, and therefore it refers to a high mental ability that intervenes in the process of learning from Creating a learning plan and using appropriate skills and strategies to solve problems helps them effectively distinguish between information they know and what they do not know [39].

III. Previous Studies

The study (Oneil & Abdi, 1996) indicated that there is a relationship between meta-learning and academic achievement, and the studies of Cecrop [7] indicated that there is a significant relationship between meta-learning and academic achievement, as Bostrom's study [5] showed that meta-learning when applied to a sample From university students, it was clear about the teaching methods among students during the teaching process, as when a student learns according to his preferred learning method, he achieves possible academic achievement. The results also indicated that there is a statistically significant relationship between effective learning and meta-learning methods.

The study (Hamlin, 2001) aimed to examine the effect of teaching with traditional learning strategies and meta-learning methods and indicated that there is no statistically significant effect of traditional learning strategies on academic achievement. The results also indicated that there is a statistically significant effect of traditional learning strategies on academic achievement. The results also indicated that there was a statistically significant effect of meta-learning on the academic achievement of a group of students who relied on the self-learning method and a group of students who relied on effective learning.

A study by Cassidy & Eachas (2007) examined the relationship between style, self-efficacy, and academic achievement among university students. The results indicated the existence of a statistically significant relationship between learning methods, competence, and academic achievement.

The study (Chitdress & Overbaugh, 2001) aimed to examine the relationship between meta-learning style and academic achievement. The study sample consisted of (204) students. The results showed that there is no significant relationship between learning style, meta-learning and academic achievement that was measured through final grades.

The study (Felder & Spurlin) refers to learning styles as distinct cognitive, emotional, and psychological behaviors that act as relatively stable materials for how the student perceives, interacts, and responds to the learning structure.

The study (Monreno & Saldama, 2005) showed that meta-learning, especially self-regulation of knowledge, is one of the effective methods in teaching students who suffer from deficiencies in the mental aspects, and that it has a role in developing some of the abilities of these students. It also plays an effective role in the learning process, when students are allowed to They are aware of what they are studying, as this plays a role in increasing understanding and improving their ability to organize themselves while learning.

The study (Laway, 2011) indicated that metacognitive processes (meta-learning) have an important

and vital role in the process of learning and successful teaching and its creation. Therefore, an effort should be made to study how to develop meta-learning skills among learners and help them achieve the application of different cognitive processes in a manner Better by controlling meta-learning skills.

The study (Al-Alwan, 2011) aimed to determine the effect of using meta-learning strategies on reading comprehension of Arabic texts. The results showed that using meta-learning strategies leads to improving reading and reading comprehension.

Studies (Wichadee, 2011) indicated an examination of the effectiveness of direct learning of meta-learning strategies on the reading comprehension ability of a group of English language learners at a private university in Thailand, and their results were the effectiveness of using meta-learning strategies in improving reading comprehension ability.

The study (Seeph, 2012) revealed the effect of training meta-learning strategies on academic reading comprehension among university students in China. The study showed a positive effect on reading comprehension. In this study indicates that the skills of superstructure include the planning, monitoring and evaluation processes through which the learner can control his knowledge in a well-known method through the development of his ability to solve problems, and the skills of metaphorical learning allow self-learning from the premise that it helps the learners on Self-awareness of their thinking.

Through previous studies, the meta-learning strategy was used and demonstrated the effectiveness of its use in developing achievement and acquiring skills such as reading comprehension, critical thinking skills, and orientation towards literature and texts. The effectiveness of the meta-learning strategy demonstrated awareness of the meta-learning process and its role in improving study habits. There is no doubt that meta-learning skills work to raise the level of Academic achievement among learners, as it increases the student's ability to think creatively and solve the problems they encounter, whether in the classroom or in the areas of their daily life, where understanding and controlling the learning process is one of the necessary skills, such as meta-learning skills in the classroom." There is a scarcity of studies that address meta-learning as a condition or trait.

IV. RESEARCH QUESTIONS

The current study seeks to investigate the extent to which the postgraduate professional diploma program students possess the meta-thinking skills at Nazwah University in education from the perspectives of students enrolled in Oman. , as well as to determine whether there is a statistically significant difference in student teacher possess off the meta-thinking skills in the Postgraduate Professional Diploma in Teaching program at Nazwah University due to students major. The study seeks to address the following questions:

- To What extent do the postgraduate professional diploma program students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman?
- Is there a statistically significant difference in student- teacher's students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman due to student major?

V. RESEARCH METHODOLOGY

This study follows the descriptive research methodology, which aims to investigate the extent to which the postgraduate professional diploma program students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman.

A. POPULATION AND STUDY SAMPLE

This study included 342 student-teachers from Nazwah University's postgraduate professional diploma in teaching program for the academic year 2023/2024, with 273 responding to the study scale as indicated in Table 1.

TABLE 1: THE STUDY SAMPLE DETAILS

Variable	Category	Frequency	Percentage
Major	**Scientific**	164	60%
	Literary	109	40%
	total	273	100%

B. STUDY TOOL

A questionnaire was utilized to gather data from respondents in order to address the study topics. Researchers that have studied the literature on the subject of the study prepared that. Following the establishment of the study goals, Likert scale questions were constructed. 35 elements that were based on research by [16] comprised the study instrument in its initial version. The scale's original edition, which included the study of [16], had 27 elements when it was finalized, following multiple revisions that referees suggested.

C. TOOL VALIDITY

The apparent tool validity was calculated by a group of 9 experts and educational experts 3 referees specializing in educational technology, 3 referees specializing in teaching methods, and 3 referees specializing in psychology), they proposed some scale improvements. The initial tool was modified to produce 27 items.

D. TOOL STABILITY

Cronbach's alpha was calculated on a sample of 35 students out of the study participants to evaluate the study tools reliability, and (0.76) was found to be appropriate to answer the research questions.

E. STUDY VARIABLES

1) Dependent variable

The extent to which the postgraduate professional diploma program students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman.

2) Independent variable

Student major:
scientific majors, literary majors

F. STATISTICAL ANALYSIS

The Statistical Package for Social studies (SPSS/28 version) was used to answer the research questions. Arithmetic means and standard deviations were calculated based on student responses in the study scale. An independent samples T- test was computed to determine whether the difference in appearance between the arithmetic means was statistically significant.

VI. FINDINGS OF THE STUDY

To answer the first question of the study, means and standard deviations were calculated" To What extent do the postgraduate professional diploma program students possess the meta-thinking skills in Nazwah University in education from the perspectives of students enrolled in Professional Diploma Programs in Oman?" Means value between (1- 2.6) represents the students' possess of the meta-thinking skills of the Postgraduate Professional Diploma in Teaching program's. The average of acquisition of meta-thinking skills by the Postgraduate Professional Diploma in Teaching program, as perceived by students, is between (2.7-3.4). From the students' perspective, a mean value between (3.5- 5) indicates that the Postgraduate Professional Diploma in Teaching students possess a high degree of meta-thinking skills.

TABLE 2 DISPLAYS THE RESEARCH TOOL ITEMS' MEANS, STANDARD DEVIATIONS, LEVELS.

NO.	Statement	Mean	Std. Dev	Rank	Degree
1	I ask myself periodically if I am meeting my goals.	2.60	1.12	30	Medium
2	I consider several alternatives to a problem before I answer.	4.22	1.12	12	High
3	I try to use strategies that have worked in the past.	4.30	1.02	11	High
4	I pace myself while learning in order to have enough time.	4.10	1.13	14	High
5	I understand my intellectual strengths and weaknesses.	4.35	1.05	7	High
6	I think about what I really need to learn before I begin a task.	4.41	0.90	1	High
7	I know how well I did once I finish a test.	4.29	1.00	9	High
8	I set specific goals before I begin a task.	4.39	0.91	3	High
9	I slow down when I encounter important information.	4.15	1.12	15	High
10	I know what kind of information is most important to learn	4.37	0.90	6	High
11	I ask myself if I have considered all options when solving a problem. .	4.20	1.01	16	High
12	I am good at organizing information.	4.05	1.13	18	High
13	I consciously focus my attention on important information.	4.30	1.11	19	High
14	I have a specific purpose for each strategy I use.	4.29	1.05	8	High
15	I learn best when I know something about the topic.	4.39	1.04	4	High
16	I know what the teacher expects me to learn.	4.10	1.13	17	High
17	I am good at remembering information.	4.32	1.15	13	High
18	I use different learning strategies depending on the situation.	3.65	1.33	2	High
19	I ask myself if there was an easier way to do things after I finish a task.	3.80	1.35	21	High
20	I have control over how well I learn.	4.33	0.93	2	High
21	I periodically review to help me understand important relationships.	4.22	1.09	10	High
22	I ask myself questions about the material before I begin.	3.83	1.23	22	High
23	I think of several ways to solve a problem and choose the best one.	4.10	1.11	20	High
24	I summarize what I've learned after I finish.	3.77	1.20	23	High
25	I ask others for help when I don't understand something.	3.68	1.41	26	High

26	I can motivate myself to learn when I need to.	3.57	1.40	25	High
27	I am aware of what strategies I use when I study.	3.64	1.42	27	High
	Over all	4.20	0.79		

Table 2 shows that the arithmetic averages of the study tool items on each of the questionnaire items and the total score of the items were favorable and high, with the average response on the total score being 4.20, and that item No. 6 in the study tool " I think about what I really need to learn before I begin a task " got the largest arithmetic mean (4.41), The first item " I ask myself periodically if I am meeting my goals." received the lowest arithmetic average of 2.60,

The findings related to the second question

Regarding the answer to the second question: the findings related to the students major variable: Table 3 shows the arithmetic averages and standard deviations in the tool regarding the student major variable.

TABLE 3: ARITHMETIC AVERAGES AND STANDARD DEVIATIONS IN IN THE TOOL REGARDING THE STUDENT MAJOR VARIABLE

Students major			
Literary Major		Scientific major	
Mean	Std. Dev.	Mean	Std. Dev.
3.95	0.80	4.25	0.61

Table 3 shows that there are apparent differences in the arithmetic averages of the estimates of the study participants depending on the student major on the overall study scale. the arithmetic mean of the students with scientific major was 4.25, while the arithmetic of the students with literary major was 3.98. An independent t-test for the independent samples was computed to determine whether the apparent discrepancies between the arithmetic means are statistically significant. As shown in Table 4.

TABLE 4: T-TEST FOR INDEPENDENT SAMPLES TO EXAMINE THE IMPACT OF THE STUDENTS MAJOR ON THERE PERSPECTIVE ABOUT THE EXTENT OF USING META LEARNING IN EDUCATION

Student major	**Mean**	**Std. Dev.**	**T**	**Df.**	**Sig.**
scientific	**4.25**	**0.61**	**1.81**	**58**	**0.070**
literary	**3.95**	**0.80**			

Significance level (α ⩽ 0.05).

It is clear from table 4 that the apparent differences between the students means according to their major are not statistically significant at the significance level 0.05, since T=1.81, with significance value of 0.07.

VII. CONCLUSION

Meta-cognitive was the main focus of this paper, and as appeared in the results, the student's knowledge and thinking directly affect raising his achievement rate, and this is consistent with previous studies, including the study [9], the study [6], and the study (Chitdress & Overbaugh, 2001).

Possessing the skill of meta-cognitive also creates a learning environment that is considered stimulating, and therefore effort must be made to study how to develop learners' meta-learning skills and help them achieve better application of various cognitive processes through controlling meta-learning skills.

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