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Project Management (PM) Tools: Awareness, Acceptance of Learning and Use, User Selected Tools, and Usage Degree in Egypt: *The Case Study of College of Management and Technology (CMT)*[1]

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ABSTRACT

This research aims to examine Project Management (PM) tools considering the awareness, acceptance of learning and use, user-selected tools, and usage degree in the College of Management and Technology (CMT), in light of the Unified Theory of Acceptance and Use of Technology (UTAUT). Having most of HE community members in the same age range, although their diversity of awareness, motives to learn and use, tools selection reasons, usage degree of PM tools, and software encourage conducting such research. The research targets the project team leaders, supervisors, and managers (majored students and staff members) as PM tools' end-users. The research participants belonged to three departments in the CMT. The presence of courses with projects in their study plans was the selection reason. Thus supports the variability of end-users back-grounds, interests, learning competencies, readiness, and project sector. The participants were surveyed through a designed questionnaire. Some surveying questions were changed and analyzed independently in accordance to the participants' group. The sample reached 113 participants - 86 students and 27 staff members, a descriptive analysis, correlation, and chi-square tests were conducted. The research discussed the relationships between the awareness, acceptance of learning and use, user-selected tools, and usage degree

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and concluded that the enhancement of end-user learning and adoption practices relied on distinguishing the impacts of individuals' factors based on their belonged group. Such a step may support team leaders, supervisors, and managers with a guide on how to encourage end-user learning and adoption.

Keywords: Project Management (PM) Tools, Awareness, Acceptance of Learning and Use, User Selected Tools, Usage Degree, Egypt, Private Higher Education (HE), The Case Study of College of Management and Technology (CMT)

1. INTRODUCTION

The usage degree of PM software has different forms, it ranged from rarely to frequently; discrete to extreme in another words. These forms are influenced by the drives of its usages, user belonged cluster (Howard et al. 2017), In most cases the role of user acceptance of computer technology, and Unified Theory of Acceptance and Use of Technology (UTAUT) may be noted as a significant role in this context. These factors were concerned in some recent studies i.e. (Abd El Halim, 2019).The selected end-user PM tools and software are associated with awareness, acceptance of learning and use and usage degree. End-user may lose chance to more success due to the impact of issues.

According to (Information and Decision Support Center System, 2020a) there are 23 registered private universities in Egypt. The number of enrolled students in these private universities reached 186181 students in July 2019 (Information and Decision Support Center System, 2020b). In 2017 technology acceptance and usage have been examined from individual views' by Howard et al. (2017), the researchers pointed out the wide range of variances in the frequent of use.

Abd El Halim (2019) investigated the criteria that matter PM software infrequent end-user in private HE sector in Egypt: tools selection, adoption intention, and user acceptance of computer technology. Although the existence of previous researches that focus on these issues, some questions are not answered yet, thus motivate for more researches on these concerns to be conducted.

2. THE RESEARCH AIM

The research mainly aims examining the PM tools with respect to the awareness, acceptance of learning and use, user selected tools, and usage degree in private HE in Egypt. Identify the relationships between these issues is beneficial for different stakeholders. The stakeholders include but not limited to projects team leaders, supervisors, project managers, sponsors and software developers whose aim an accurate determination the end-user requirements' during as an initial phase of software development procedures. Reaching expectations of the customer is the objective that triggered projects Sommerville (2011).

3. THE RESEARCH IMPORTANCE

Gaining all advantages of PM tools, software is not yet attained. Making an allowance for the potential advantages of adopting PM software, and tools is partially considered. Thus addressing these concerns is justified due to the attended opportunity for applying the best practices, the positive impact on the project deliverables and outcomes, the end-user support that may possibly occurred. Providing a better understanding of end-user motives and assessing the current awareness, acceptance of learning and use, user selected tools, usage degree are mandatory activities to be accomplished before planning for any enhancement proceed.

4. LITERATURE REVIEW

4.1 User Acceptance and Use of Technology Factors

Early researches paid attention to the individual perspective when studied user acceptance of computer technology and its factors such as Davis et al. (1989). This research concentrated on user acceptance of computer technology and suggested computer usage' individual attitude drives: perceived usefulness, and perceived ease of use.

The UTAUT by Venkatesh et al. (2003) defined the elements that affect information system behavioral while dependent variables were behavioral intention and usage. The social influence and expectancies in regards to performance, and effort were informed as affecting elements. Additionally, the age, gender, voluntariness, and experiences were stated

but as moderators factors. UTAUT model was functionally applied and revised by (Howard et al. 2017) they ended their research by a revised UTAUT model after they examined the technology acceptance and usage from the individual perspective.

User adoption intention, tools selection, and acceptance of technology issues have been studied in 2018 by (Rahi et al. 2018a); (Karahoca et al. 2018) and (Rahi et al. 2018b). In Nakayama & Chen (2016) the PM tools influence on project estimates and benefits was investigated, PM framework for improving productivity performance was presented by (Liao et al. 2017) These studies examined the early mentioned issues based on sector/ industry, tool, and user group. This point out to the insufficient studies concentred on end-user aspects such as sector, usage pattern, and any other related element as well.

In the project management context, Liberatore & Pollack-Johnson (2003) stated the essentially of PM methods and techniques (i.e. Critical Path Method (CPM), and Program or Project Evaluation and Review Technique - PERT for risk analysis.) for enhancing project planning and control. Additionally, the associations between the environmental and intermediate elements have been investigated. Among the environmental: years of experience in PM as a team member or leader, and the number of projects worked on during the last year, meanwhile, software use category (project planning only versus planning and control), the initial year of software usage were instances of intermediate factors- PM software usage (Liberatore & Pollack-Johnson, 2003). The research compared PM software usage for planning to usage for both planning and control. Moreover, PM software use degree and the level of PM software package have been studied.

In an early publication, PM tools, Project culture, and leadership were recognized as a subset of defined critical factors that lead to project success as reported by Milosevic & Patanaku (2005).

In one of the most recent publications, Aguilera (2020) discussed people readiness. The author reported the human element as a key for project success where the clearness of roles and responsibilities is mandatory

before the project starts. A transition and activation planning project guiding principles instances were also offered Aguilera (2020).

Errida & Lotfi (2020) concluded communication, empowerment and coaching, training, executive engagement, development of project management culture, and building capacity of change tasks as assistant activities in change readiness for applying a Project Management Methodology (PMM).

4.2 PM Tools Usage Degree

The online and offline PM tools have a role on maintain project achievements and managing project time, cost, and quality as well D & Jr (2017) . This study concluded the PM tools that widely adopted and other tools support online and productivity. PM tools were considered in earlier studies, Broder & Pihir (2007) clarified the computers adoption/ usages shapes were categorized based on their role in the project, its significance, and the main causes of failure, and how to use software tools to escape. Additionally, a country based study in Croatia by (Pihir et al. 2008) was investigated PM education and how project success is impacted by Information Communication Technology- ICT. Due to the study results on the impact of PM education in amplifying project achievements, and reported advantages, the study suggested more investment on PM education. Adopting PM tools should be encouraged by project executives, and project managers D& Jr (2017).

In Sokołowska-Woźniak (2020), Work Breakdown Structures (WBS), PERT Charts, Run Sheets and Gantt Charts were categorized as subset of planning tools and systems used in event monitoring.

The casual PM end-user in Private HE in Egypt was considered in a study by Abd El Halim (2019). The interactions between tools selection, adoption intention, and acceptance of computer technology factors were identified, the study ended by developing a model illustrated the study recognized relationships.

As prior lines highlighted the importance of investigating and assessing the current end-user awareness, selected tools, usage degree, learning and adoption acceptance of the PM end-users, supported by the reported

believes on PM importance, and benefits. As a vital practice proceeding to any strategy developed aims to preserve the current end-users interests' and encourage potential users in being aware, make use, adopt PM tools, and software as well.

5. RESEARCH PROBLEM

Applying the best practices and maximizing PM methodology adoption benefits is not an easy mission, it has some barriers and required better understating of user/ learner motives, intentions, and the associations between them. The private HE is a rich sector with unique cases to be studied. Although the existence of some studies concerning PM tools, awareness, acceptance of learning and use, user tools selection, and usage pattern aspects, a very limited number have focused on Private HE in Egypt. The inadequacy of researches studying the above-mentioned aspects justifies having more researches to fill this identified gap.

6. RESEARCH INVESTIGATED FACTORS, AND HYPOTHESES

The research framework included the investigated factor and hypotheses were developed based on the conducted review of the previous related works. Figure 1 illustrates research framework and hypotheses. This resulted in four factors were concerned and three hypotheses were subject of tests. The constructed hypotheses are as following:

H1: There is no significant difference between the acceptance of learning and use and user selected tools

H2: There is no significant difference between the acceptance of learning and use and usage degree

H3: There is no significant difference between the acceptance of learning and use and awareness

H4: There is no significant difference between user selected tools and usage degree

H5: There is no significant difference between user selected tools and awareness

H6: There is no significant difference between awareness and usage degree

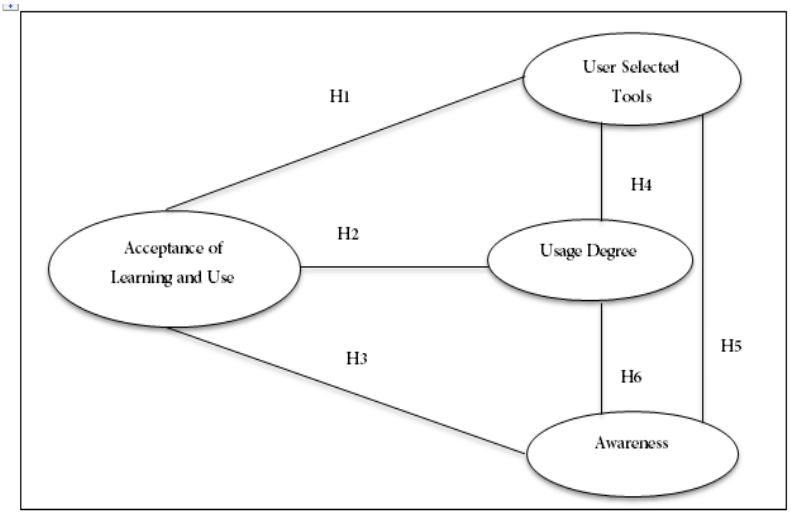

Figure 1: Research Framework and Hypotheses

7. RESEARCH METHODOLOGY

7.1 Population Description and Sample Size

CMT was considered as the sample of the research for many reasons. On one hand, CMT was established from over 25 years ago; it has a well-developed technological infrastructure, available laboratories, and learning facilities, and attended technical support that provides a steady and stable learning environment to students. On the other hand, the assurance of research conduction and investigating the relationships between research variables in the absence of learning environment factors impact on research outcomes.

In this research the population size reached 687 (Business Administration BA students and staff members who were involved in project(s) whether as team leader, supervisor and/or project manager in their departments).The participants were belonged to three departments: Business Information Systems, Accounting and Finance, and Marketing and International Business. The students were the majored students (last stage/ level four) to ensure their involvement at

least in project if not more. These three departments were chosen due to the existence of courses with projects in their study plans.

The sample size was 113 students and staff members in total. This sample is distributed randomly to the (last stage/ level four) students and staff members of the three selected departments: the sample size was determined with 95% for the confidence level, and with ±8.43 for the confidence interval Sekaran (2003). The gathered responses were 86 (76.1%) students and 27 (23.9%) staff members.

7.2 Data Gathering Method

The number of circulated questionnaires to the target participants has been exceeded 150. In the first round 79 questionnaires have been collected. The second round ended by receiving 40 more questionnaires. All returned questionnaires were scanned for validity where 6 questionnaires were excluded due to invalidity. By the end, 113 returned questionnaires were valid.

7.3 Questionnaire Design

The questionnaire was constructed taken into consideration the required completing time, easiness. According to the defined factors, the research participants requested to offer their views toward the statements and questions corresponded to the investigated factors. Both participants groups (students and staff members) have the same questionnaire sections but the staff members group has two more questions about their experience, age. The first section - statements cover the duration of their last involved project in months, their familiarity with a number of PM tools. For the same number of PM tools their selection to use or previously used based on their preferences, their usage degree ranged from rarely to always. The second section- questions to identify their previously used PM software if any i.e. Microsoft Project Standard, their agreement/ acceptance to learn PM tools and to use, the contribution of Information Technologies and software in project success, difference between sectors regarding the gaining PM adoption benefits, current/ latest project belonged sector, current/ latest project educational level. In addition to state their experiences, age, these were only requested from staff members –

project supervisors group to answer. Table 1 below provides a summary of the designed questionnaire: research variables, responses alternatives, and statements/ questions corresponding to each variable.

Table 1: Research questionnaire design: variables, responses alternatives, and statements /questions

Research Variable	Responses Alternatives		Statements / Questions
Project Length	Varied Durations		Project duration in months
Awareness	For Awareness Aware Not Aware	PM Tools	Gantt chart
			Cause and effect chart
			Critical Path Method (CPM)
Tools Selection	For Tool s Selection Selected √ Not Selected ×		Develop a Risk Management Plan
			Earned Value
			Generate Project Budget
Usage Degree	For Usage Degree Not ever Rarely Occasionally/ irregularly Regularly Always		Participatory Impact Pathways Analysis
			Perform Post-Project Review
			PERT chart
			PRINCE2 (Projects IN Controlled Environments)
			Schedule Resources and Perform Resource Levelling
			Track and Manage Performance of the Project
			Work Breakdown Structure (WBS)
Previously used PM software	Varied		Please specify your previously used any common PM software i.e. Microsoft Project Standard?
Acceptance to learn	Yes No		Are you willing to learn PM tools/ software?

Acceptance to use PM tools	Yes No	Are you willing to use PM tools/ software in managing your project (s)?
The contribution of Information Technologies and software in project success	Yes No	Are you agreed that using Information Technologies and software in project contribute to project success?
The difference between sectors regarding the gaining PM adoption benefits	Yes No	Do you think that there is no different from sector to another regarding the gaining PM adoption benefits?
Current/ latest project belonged sector	Varied	Please specify your current/ latest project belonged sector?
Current/ latest project educational level	Undergraduate Studies Postgraduate Studies	Please specify your current/ latest project educational level?
Experience (Only for staff members – project supervisors)	Varied	Experience in years
Age (Only for staff members – project supervisors)	Below 25 26-36 37- 47 >=48	Age in years

8. DATA COLLECTION PROCESS

The research participants were requested to provide information on project (s) which they were involved in terms of the duration of the project (s) in months, the used/ selected PM tools and techniques which they are aware of, the frequent rate of use/ adoption, their previously used PM software if any, determine whether they are willing to use/ learn PM software and use it managing their project(s), their current/ latest project belonged sector. Additionally, the participants provided their views toward: the contribution of IT and software on the project success, the dependency between gaining PM adoption benefits, and the project sector. Moreover, they were identified their current/ latest

project educational level, staff members, and project supervisors were requested to state their experiences in years, and their age.

A questionnaire was designed for use to gather the required data from the research target participants. The analytical tool SPSS was employed in analyzing the gathered data, taking into consideration group differences. The investigated group differences and adoption degrees were revealed through the research results and outcomes; where anticipated beneficiaries of the research outcomes and conclusions are PM specialists, team leaders, project supervisors, and managers.

9. STATISTICAL ANALYSIS RESULTS

9.1 Reliability Test

Reliability test is in employment to investigate the consistency of the instrument (Sekaran,2003). In this research the value of Cronbach's Alpha registered .831 on the scale of all variables (N= 36 variables) in the designed questionnaire

9.2 Pearson-product-moment Test

Conducting the Pearson-product-moment test enabled more accurate results on strength or a correlation between two sets of data (Lane, 2013). It conducted between each questionnaire sub-sections questions and its corresponding total, then between all questionnaire questions and the overall total. The results showed positive highly significant correlations for all questionnaire questions and the overall total for most of the cases (33 out of 36 questions), and positive significant correlation for only three questions.

9.3 Descriptive Analysis

Table 2 demonstrates the research sample description using percent according to participants' answers according to project Length in months, current/ latest project belonged sector, current/ latest project educational level, and experience in years, and age (Only for staff members – project supervisors)

Table 2: Sample General Descriptive Using Percent

Variable	Responses	%
Project Length in Months	Less than 12 Months	40.7%
	Other Lengths	59.3%
Current/ latest project belonged sector	IT and BIS	31%
	Marketing	10.6%
	Finance and Accounting	18.6%
	Mass Media	3.5%
	Hotel and Tourism	2.7%
	Construction	8.8%
	Oil and Gas	5.3%
	Economic and Financial Analysis	2.7%
	Education and Research	4.4%
	Agriculture	12.4%
Please specify your previously used any common PM software i.e. Microsoft Project Standard?	Microsoft Project Other	91.2% 8.8%
Are you willing to learn PM tools/ software?	Yes No	89% 11%
Are you willing to use PM tools/ software in managing your project (s)?	Yes No	79% 21%
Are you agreed that using Information Technologies and software in project contribute to project success?	Yes No	87% 13%
Do you think that there is no different from sector to another regarding the gaining PM adoption benefits?	Yes No	88% 12%
Current/ latest project educational level	Undergraduate Studies	76.1%
	Post Graduate Studies	23.9%
Experience (Only for staff members– project supervisors)	1-5 years	27.4%
	6-10 years	7.1%
	11-15 years	19.1%
	16-20 years	42.8%
	>20 years	3.6%
Age (Only for staff members – project supervisors)	<=25	40.7%
	26-36	23.0%
	37-47	19.5%
	>47	16.8%

Table 3: illustrates the descriptive analysis for the mentioned by participants PM Software regarding awareness and usage degree based on participants' responses.

Table 3: Descriptive Analysis for participants' mentioned PM Software

Project Management Software	Awareness				Usage Degrees									
	Aware		Not Aware		Not ever		Rarely		Occasionally /irregularly		Regularly		Always	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Microsoft Project Standard	60	53.1	53	46.9	49	43.4	7	6.2	19	16.8	18	15.6	20	17.7

The frequencies of participates responses' and percent regarding their awareness with PM tools are demonstrated in the following table – Table 4. The received values for frequencies and its corresponded % were presented for both aware and not aware cases.

Table 4: PM Tools Participates' Awareness Descriptive Statistics Rated by Frequencies and Percent

Tool	Aware		Tool	Not Aware	
	Frequency	%		Frequency	%
Track and Manage Performance of the Project	64	56.6 %	PRINCE2	93	82.3 %
Critical Path Method	62	54.9 %	Participatory Impact Pathways Analysis	91	80.5 %
Perform Post-Project Review	55	48.7 %	Earned Value	84	74.3 %
Gantt chart	55	48.7 %	Schedule Resources and Perform Resource Levelling	81	71.7 %
Cause and effect chart	47	41.6 %	Work Breakdown Structure	76	67.3 %
PERT chart	46	40.7 %	Generate the Project Budget	74	65.5 %
Develop a Risk Management Plan	41	36.3 %	Develop a Risk Management Plan	72	63.7 %
Generate the Project Budget	39	34.5 %	PERT chart	67	59.3 %
Work Breakdown Structure	37	32.7 %	Cause and effect chart	66	58.4 %
Schedule Resources and Perform Resource Levelling	32	28.3 %	Gantt chart	58	51.3 %
Earned Value	29	25.7 %	Perform Post-Project Review	57	50.4 %
Participatory Impact Pathways Analysis	22	19.5 %	Critical Path Method	51	45.1 %
PRINCE2	20	17.7 %	Track and Manage Performance of the Project	49	43.4 %

PM tools usage degrees of tools described by frequencies and percent, the observed usage rang from not ever used to always as Tale 5 presents.

Table 5: PM Tools Usage Degrees Descriptive Statistics Rated By Frequencies and Percent

	Usage Degrees (Frequency and %)									
	Not ever		Rarely		Occasionally/ irregularly		Regularly		Always	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Critical Path Method	37	33%	38	34%	22	19%	9	8%	7	5%
Gantt chart	42	37%	30	27%	29	26%	9	8%	3	2%
PERT chart	39	35%	35	31%	20	18%	11	10%	8	6%
Cause and effect chart	47	42%	33	29%	21	19%	8	7%	4	3%
Generate the Project Budget	45	40%	40	35%	10	9%	10	9%	8	6%
Develop a Risk Management Plan	43	38%	43	38%	8	7%	13	12%	6	5%
Track and Manage Performance of the Project	57	50%	12	11%	18	16%	16	14%	10	8%
Work Breakdown Structure	44	39%	31	27%	19	17%	14	12%	5	4%
Perform Post-Project Review	58	51%	15	13%	18	16%	13	12%	9	7%
Schedule Resources and Perform Resource Levelling	49	43%	38	34%	11	10%	8	7%	7	5%
Earned Value	52	46%	40	35%	4	4%	10	9%	7	5%
Participatory Impact Pathways Analysis	61	54%	36	32%	8	7%	4	4%	4	3%
PRINCE2	73	65%	26	23%	12	11%	-	0%	2	2%

9.4 Hypotheses Testing

9.4.1 Correlations Tests

The correlation and chi-square were employed for testing associations' presence between research variables and contributing answers for the proposed questions. The results of the conducted examinations were

offered through the current section. Correlation tests results for the research hypotheses are demonstrated in Table 6, while summary of the same is displayed in Table 7.

Table 6: Corrections Tests Outcomes

		User Selected Tools	Usage Degree	Awareness	Acceptance of learning and
User Selected Tools	Pearson Correlation	1	-.459**	1.000**	-.097
	Sig. (2-tailed)		.000	.000	.306
	N	113	113	113	113
Usage Degree	Pearson Correlation	-.459**	1	-.459**	.525**
	Sig. (2-tailed)	.000		.000	.000
Awareness	Pearson Correlation	1.000**	-.459**	1	-.097
	Sig. (2-tailed)	.000	.000		.306
Acceptance of learning and use	Pearson Correlation	-.097	.525**	-.097	1
	Sig. (2-tailed)	.306	.000	.306	
**. Correlation is significant at the 0.01 level (2-tailed).					

Table 7: Summary of Correlation Results For Research Hypotheses

Hypothesis	Factors	N of Valid Cases	Pearson Correlation Value	Sig. (2-tailed)	Result
H1	Acceptance of learning and use *User Selected Tools	113	-.097	.306	Not Significant
H2	Acceptance of learning and use * Usage Degree	113	.525**	.000	Highly Significant
H3	Acceptance of learning and use * Awareness	113	-.097	.306	Not Significant
H4	User Selected Tools* Usage Degree	113	-.459**	. 000	Highly Significant
H5	User Selected Tools* Awareness	113	1.000**	.000	Highly Significant
H6	Awareness * Usage Degree	113	-.459**	.000	Highly Significant

* Significant at the 0.05 level (2-tailed)

** Significant at the 0.01 level (2-tailed)

Table 8 displays corrections test values for PM tools awareness. Meanwhile, Table 9 summaries existed relationships existence based on corrections test outcomes for project duration, PM tools awareness categorized according to the relationship strength degree into high significant correlation, and significant correlation. The correlations results for PM tools usage degrees were illustrated in Table 10.

Table 8: Correlations – PM Tools Awareness

		Gantt chart	Work Breakdown Structure	Critical Path Method	PRINCE2	Earned Value	Cause and effect chart	PERT chart	Participatory Impact Pathways Analysis	Schedule Resources and Perform Resource Levelling	Generate Project Budget	Develop a Risk Management Plan	Track and Manage Performance of the Project	Perform Post-Project Review
Gantt chart	Pearson Correlation	1	.423**	.220	.197	.165	.104	.305*	.208	.256*	.392**	.176	.300*	.078
Work Breakdown Structure	Pearson Correlation	.423**	1	.221	.201	.505**	.235	.235	.150	.597**	.235	.235	.076	.273*
Critical Path Method	Pearson Correlation	.220	.221	1	.165	.283*	.096	.449**	.222	.298*	.333**	.412**	.552**	.408**
PRINCE2	Pearson Correlation	.197	.201	.165	1	.156	.073	.011	.168	.145	.290*	.181	.191	.232
Earned Value	Pearson Correlation	.165	.505**	.283*	.156	1	.452**	.231	.124	.645**	.387**	.323**	.285*	.202
Cause and effect chart	Pearson Correlation	.104	.235	.096	.073	.452**	1	.216	.112	.479**	.357**	.164	.071	.277*
PERT chart	Pearson Correlation	.305*	.235	.449**	.011	.231	.216	1	-.005	.387**	.015	.350**	.392**	.165
Participatory Impact Pathways Analysis	Pearson Correlation	.208	.150	.222	.168	.124	.112	-.005	1	.176	.256*	.184	.274*	.351**
Schedule Resources and Perform Resource Levelling	Pearson Correlation	.256*	.597**	.298*	.145	.645**	.479**	.387**	.176	1	.414**	.350**	.185	.235
Generate Project Budget	Pearson Correlation	.392**	.235	.333**	.290*	.387**	.357**	.015	.256*	.414**	1	.357**	.392**	.405**
Develop a Risk Management Plan	Pearson Correlation	.176	.235	.412**	.181	.323**	.164	.350**	.184	.350**	.357**	1	.456**	.533**
Track and Manage Performance of the Project	Pearson Correlation	.300*	.076	.552**	.191	.285*	.071	.392**	.274*	.185	.392**	.456**	1	.434**
Perform Post-Project Review	Pearson Correlation	.078	.273*	.408**	.232	.202	.277*	.165	.351**	.235	.405**	.533**	.434**	1

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 9: Summary Relationships Existence Based on Corrections Tests Outcomes for PM Tools

		High Significant Correlation	Significant Correlation
1	Critical Path Method	Project duration, PERT chart, Generate Project Budget, Develop a Risk Management Plan, Track and Manage Performance of the Project, Perform Post-Project Review, and Microsoft Project Standard	Earned Value and Schedule Resources and Perform Resource Levelling
2	Gantt chart	Work Breakdown Structure, Generate Project Budget, and MS Project Standard	PERT chart, Schedule Resources and Perform Resource Levelling, and Track and Manage Performance of the Project
3	PERT chart	Critical Path Method, Schedule Resources and Perform Resource Levelling, Develop a Risk Management Plan, Track and Manage Performance of the Project, and Microsoft Project Standard	project duration, Gantt charts Participatory Impact Pathways Analysis has positive high correlation with Perform Post-Project Review
4	Cause and effect chart	Earned Value, Schedule Resources and Perform Resource Levelling, and Generate the Project Budget	Perform Post-Project Review
5	Generate the Project Budget	Gantt chart, Critical Path Method, Earned Value, Cause and effect chart, Schedule Resources and Perform Resource Levelling, Develop a Risk Management Plan, Track and Manage Performance of the Project, and Perform Post-Project Review	PRINCE2, and Participatory Impact Pathways Analysis
6	Develop a Risk Management Plan	Critical Path Method, Earned Value, PERT chart, Schedule Resources and Perform Resource Levelling, Generate the Project Budget, Track and Manage Performance of the Project, and Perform Post-Project Review	-
7	Track and Manage Performance of the Project	Critical Path Method, PERT chart, Generate the Project Budget, Develop a Risk Management Plan, Perform Post-Project Review, and Microsoft Project Standard	Gantt chart, Earned Value, and Participatory Impact Pathways Analysis
8	Work Breakdown Structure	Gantt chart, Generate Project Budget, and Schedule Resources and Perform Resource Levelling	Perform Post-Project Review, and MS Project Standard
9	Perform Post-Project Review	Critical Path Method, Participatory Impact Pathways Analysis, Generate the Project Budget, Develop a Risk Management Plan, and Track and Manage Performance of the Project	Work Breakdown Structure, Cause and effect chart, Generate the Project Budget, and Microsoft Project Standard
10	Schedule Resources and Perform Resource Levelling	Work Breakdown Structure, Earned Value, Cause and effect chart, PERT chart, Generate Project Budget, and Develop a Risk Management Plan	Critical Path Method, and Microsoft Project Standard
11	Earned Value	Work Breakdown Structure, Cause and effect chart, Schedule Resources and Perform Resource Levelling, Generate the Project Budget, Develop a Risk Management Plan	Critical Path Method, and Track and Manage Performance of the Project
12	Participatory Impact Pathways Analysis	Perform Post-Project Review	Generate the Project Budget, Track and Manage Performance of the Project
13	PRINCE2	-	Generate Project Budget

Table 10: Correlations Tests for PM Tools Usage Degrees

Correlations														
		Gantt chart	Work Breakdown Structure	Critical Path	PRINCE2	Earned Value	Cause and effect chart	PERT chart	Participatory Impact Pathways Analysis	Schedule Resources and Perform Resource Levelling	Generate Project Budget	Develop a Risk Management Plan	Track and Manage Performance of the Project	Perform Post-Project Review
Gantt chart	Pearson Correlation	1	.437**	.303**	.068	.034	.349**	.245**	.281**	.315**	.262**	.319**	.134	.087
	Sig. (2-tailed)		.000	.001	.475	.724	.000	.009	.003	.001	.005	.001	.156	.360
	N	113	113	113	113	113	113	113	113	113	113	113	113	113
Work Breakdown Structure	Pearson Correlation	.437**	1	.415**	.440**	.501**	.417**	.289**	.360**	.469**	.315**	.413**	.170	.218*
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.002	.000	.000	.001	.000	.072	.020
Critical Path	Pearson Correlation	.303**	.415**	1	.136	.414**	.288**	.413**	.422**	.398**	.239*	.272**	.298**	.282**
	Sig. (2-tailed)	.001	.000		.151	.000	.002	.000	.000	.000	.011	.004	.001	.002
PRINCE2	Pearson Correlation	.068	.440**	.136	1	.406**	.206*	.195*	.325**	.336**	.296**	.242**	.086	.170
	Sig. (2-tailed)	.475	.000	.151		.000	.029	.038	.000	.000	.001	.010	.367	.073
Earned Value	Pearson Correlation	.034	.501**	.414**	.406**	1	.280**	.377**	.391**	.319**	.274**	.410**	.267**	.379**
	Sig. (2-tailed)	.724	.000	.000	.000		.003	.000	.000	.001	.003	.000	.004	.000
Cause and effect chart	Pearson Correlation	.349**	.417**	.288**	.206*	.280**	1	.228*	.370**	.407**	.391**	.500**	.307**	.380**
	Sig. (2-tailed)	.000	.000	.002	.029	.003		.015	.000	.000	.000	.000	.001	.000
PERT chart	Pearson Correlation	.245**	.289**	.413**	.195*	.377**	.228*	1	.342**	.515**	.423**	.307**	.327**	.160
	Sig. (2-tailed)	.009	.002	.000	.038	.000	.015		.000	.000	.000	.001	.000	.091
Participatory Impact Pathways Analysis	Pearson Correlation	.281**	.360**	.422**	.325**	.391**	.370**	.342**	1	.500**	.335**	.391**	.321**	.354**
	Sig. (2-tailed)	.003	.000	.000	.000	.000	.000	.000		.000	.000	.000	.001	.000
Schedule Resources and Perform Resource Levelling	Pearson Correlation	.315**	.469**	.398**	.336**	.319**	.407**	.515**	.500**	1	.642**	.367**	.441**	.302**
	Sig. (2-tailed)	.001	.000	.000	.000	.001	.000	.000	.000		.000	.000	.000	.001
Generate Project Budget	Pearson Correlation	.262**	.315**	.239*	.296**	.274**	.391**	.423**	.335**	.642**	1	.510**	.508**	.323**
	Sig. (2-tailed)	.005	.001	.011	.001	.003	.000	.000	.000	.000		.000	.000	.000
Develop a Risk Management Plan	Pearson Correlation	.319**	.413**	.272**	.242**	.410**	.500**	.307**	.391**	.367**	.510**	1	.503**	.500**
	Sig. (2-tailed)	.001	.000	.004	.010	.000	.000	.001	.000	.000	.000		.000	.000

Track and Manage Performance of the Project	Pearson Correlation	.134	.170	.298**	.086	.267**	.307**	.327**	.321**	.441**	.508**	.503**	1	.613**
	Sig. (2-tailed)	.156	.072	.001	.367	.004	.001	.000	.001	.000	.000	.000		.000
Perform Post-Project Review	Pearson Correlation	.087	.218*	.282**	.170	.379**	.380**	.160	.354**	.302**	.323**	.500**	.613**	1
	Sig. (2-tailed)	.360	.020	.002	.073	.000	.000	.091	.000	.001	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

9.4.2 Chi-square Tests

Table 11 demonstrates the chi-square tests results for the PM tools and MS project standard software. According to the results all PM tools usage shave highly significant relationships to each other. A summary of chi-square tests results for PM tools usage is provided by Table 12 below.

Table 11: Chi-square Tests Results For PM Tools Usage and Microsoft Project Standard

Test Statistics														
	Gantt chart	Work Breakdown Structure	Critical Path	PRINCE2	Earned Value	Cause and effect chart	PERT chart	Participatory Impact Pathways Analysis	Schedule Resources and Perform Resource Levelling	Generate Project Budget	Develop a Risk Management Plan	Track and Manage Performance of the Project	Perform Post-Project Review	Microsoft Project Standard
Chi-Square	46.071a	40.938a	38.637a	104.805b	84.743a	55.982a	34.389a	113.239a	67.487a	59.080a	62.531a	67.221a	71.204a	43.416a
df	4	4	4	3	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 22.6.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 28.3.

Table 12: Summary of Chi-square Tests Results For PM Tools Usage

Tool	Pearson Chi-Square Value	Asymp. Sig. (2-sided)	Result
Gantt chart	46.071a	.000	Highly Significant
Work Breakdown Structure	40.938a	.000	Highly Significant
Critical Path	38.637a	.000	Highly Significant
PRINCE2	104.805b	.000	Highly Significant
Earned Value	84.743a	.000	Highly Significant
Cause and effect chart	55.982a	.000	Highly Significant
PERT chart	34.389a	.000	Highly Significant
Participatory Impact Pathways Analysis	113.239a	.000	Highly Significant
Schedule Resources and Perform Resource Levelling	67.487a	.000	Highly Significant
Generate Project Budget	59.080a	.000	Highly Significant
Develop a Risk Management Plan	62.531a	.000	Highly Significant
Track and Manage Performance of the Project	67.221a	.000	Highly Significant
Perform Post-Project Review	71.204a	.000	Highly Significant
Microsoft Project Standard	43.416a	.000	Highly Significant

10. RESEARCH CONCLUSIONS

The current research studied PM tools, and software regarding the acceptance of learning and use, user selected tools, awareness, and usage degree factors in private HE, four out of six hypotheses were proven correlated with a highly significant relationship and resulted in confirming the strongly correlation between these four pairs: acceptance of learning and use and usage degree, user selected tools and usage degree, user selected tools and awareness, and awareness and usage degree. The two other pairs acceptance of learning and use and awareness, and acceptance of learning and use and user selected tools were not correlated and reported not significant relationships. Thus assist in understandings the differences between these factors and help decision-makers, course coordinators, and educational programs designers, and developers to construct their tactics and plans

considering the reported relationships. Davis et al. (1989) stated factors impacted the person's attitude toward computer were (perceived usefulness, and perceived ease of use). The usefulness were confirmed by participant responses' when most of them showed their agreement on that using Information Technologies and software in project contribute to project success. The participant showed awareness and tools usage level reflect their beliefs on the same, this aligned with what was indicated by Liberatore & Pollack-Johnson (2003) as PM methods and techniques essentially i.e. Critical Path Method (CPM), and Program or Project Evaluation and Review Technique - PERT for risk analysis of).

In conclusion, although the usefulness of the researches currently available, the research results and verified hypotheses early provided recommend conducting additional studies with different focuses and answers for new questions in this context. Acceptance of technology factors, tools selection, and usage drives and levels are still research interests and questionable areas.

Learner is the focal point in the learning process; where any proposal for enhancements should pay attention to individuals' differences, awareness, motives, reasons and readiness to learn because these have decided their tools selection, and usage patterns/adoption level. Having concentration on investigating the above is an initial process to get the end-user ready and encourages to be involved in learning process. This research focused on these end-user issues', due to the great influence of them on the acceptance level and acceptance of end-user to learn, use, benefit of adopting software and achieve their project targeted level of success.

HE is a highly nominated sector to maximize the returns of PM methodology adoption in their developed educational program plans. The PM tools observed awareness and the frequent rate of use are promising considering the variances between program plans in the count of courses with a project requirement.

Having an accepted level of user approval on both learning and use is an initial point, it triggers, and supports a smooth learning process; this may result in attaining the targeted desired PM tools and software usage

advantages. Failing to obtain this initial point may perform an obstacle that negatively impacted the learning process, and might transfer projects into impaired ones.

11. RESEARCH RECOMMENDATIONS

HE decision-makers, course coordinators, and educational programs designers, and developers are strongly encouraged and recommended to:

- Considering individuals' factors and their belonged group impacts while learning and adoption practices are applied
- Developing the development strategies based on a better understanding of their community members' motives and acceptance of technology factors.
- Revising their offered degrees, educational programs plans, and courses curricula on a regular base regarding the inclusion of technological tools and software.
- Providing on campuses computer-based special-purpose tools and applications, technical, and practical assistants as well.
- Improving the culture of PM adoption relied on supporting HE community members whether students or staff members to use in any project they are involved in regardless of their roles (supervisor, assistant, ..), degrees (undergraduates/postgraduates), and projects natures (course project/ graduations projects).

12. RESEARCH LIMITATIONS AND FUTURE WORK DIRECTIONS

The recognized PM advantages across business and sectors, HE sector has a noted PM tools awareness and varying usage levels. Although the acceptance of learning and usage degree observed association between acceptance of learning and usage degree among community members in the HE sector, generalization is not appropriated in all cases/ sectors. Assessing the same in other sectors is required. Additionally, the role of decision-makers can't be neglected and needed to be measured. Having multiple PM tools and software handy is good but not warrant achieving

the targeted success, developing a road map can assist in this. Conducting more studies concerned the above, and providing answers for related questions is a subject of future works directions.

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ملخص البحث باللغة العربية

يهدف هذا البحث إلى دراسة أدوات إدارة المشروعات مع الأخذ في الإعتبار الإلمام، وقبول التعلم والاستخدام، والأدوات التي يختارها المستخدم، ودرجة الاستخدام بكلية الإدارة والتكنولوجيا، في ضوء النظرية الموحدة لقبول واستخدام التكنولوجيا UTAUT. إن وجود معظم أفراد مجتمع التعليم العالي تقريبا في نفس الفئة العمرية بالرغم من تنوع إلمامهم ودوافعهم للتعلم والاستخدام، وأسباب اختيارهم لأدوات وبرمجيات إدارة المشروعات، ودرجة استخدامها يشجع على إجراء مثل هذا البحث. يستهدف البحث قادة فرق المشروعات والمشرفين والمديرين (الطلاب المتخصصين وأعضاء هيئة التدريس) كمستخدمين نهائيين لأدوات إدارة المشروع. ينتمي المشاركون في البحث إلى ثلاثة أقسام تعليمية بكلية الإدارة والتكنولوجيا ويعد توافر مقررات تتطلب المشروعات ضمن الخطط الدراسية لهذه الأقسام هو سبب الإختيار. مما يدعم تنوع لخلفيات المستخدمين النهائيين، والاهتمامات، وكفاءات التعلم، الجاهزية والاستعداد، وقطاع المشروع. تم استطلاع رأي المشاركون من خلال استبيان مصمم. ووفقًا لمجموعة المشاركين تم تغيير بعض أسئلة المسح وتحليلها بشكل مستقل. وصلت العينة إلى 113 مشاركًا - 86 طالب و27 عضو هيئة تدريس، وتم إجراء التحليل الوصفي والارتباط واختبارات مربع كاي Correlation and Chi-square. ناقش البحث العلاقات بين الإلمام وقبول التعلم والاستخدام والأدوات التي يختارها المستخدم ودرجة الاستخدام. وخلص إلى أن تعزيز ممارسات التعلم والتبنى للمستخدم النهائي يعتمد على التمييز بين تأثيرات العوامل الفردية بناءً على المجموعة التي ينتمون إليها. قد تدعم هذه الخطوة قادة الفرق والمشرفين والمديرين بدليل حول كيفية تشجيع أنشطة التعلم والتبنى للمستخدم النهائي وكسب المزيد من المزايا لنبنى أداة (أدوات) إدارة المشروعات والبرمجيات.

الكلمات المفتاحية: أدوات إدارة المشروعات، الإلمام، قبول التعلم والإستخدام، والأدوات التي يختارها المستخدم، درجة الإستخدام، مصر، التعليم العالي، دراسة حالة كلية الإدارة والتكنولوجيا

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