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Adoption of Content Management Systems in Libyan Higher Education: A Technology Acceptance Model Analysis

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Abstract:
Background*: This study examines faculty adoption of Content Management Systems (CMS) in Libyan higher education through the Technology Acceptance Model (TAM). The research aims to bridge gaps in understanding CMS adoption dynamics in a resource-constrained context exacerbated by the COVID-19 pandemic.*
Materials and Methods*: A mixed-methods approach was employed, combining surveys (N = 150 faculty members) and semi-structured interviews (n = 20) across five Libyan universities. The study focused on perceived usefulness (PU) and perceived ease of use (PEOU) as predictors of CMS adoption.*
Results: *Perceived usefulness (β = 0.55, p < 0.001) and ease of use significantly predicted CMS adoption. STEM disciplines reported 23% higher PU than Humanities, while trained faculty demonstrated 75% greater weekly CMS usage than untrained peers (p < 0.001). Key barriers included inadequate training, technical infrastructure gaps, and resistance among senior faculty (>50 years).*
Conclusion*: The study advocates for institutional policies prioritizing CMS training, age-inclusive support, and cross-disciplinary platform customization. These recommendations aim to guide Libyan universities in addressing technological divides and enhancing digital readiness post-pandemic. This retains all original abstract content but reorganizes it under the specified headings for clarity. Let me know if further adjustments are needed!*
Key Word*: Content Management Systems (CMS), Technology Acceptance Model (TAM), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Libyan Higher Education.*

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I. Introduction

The center of interest in this research is the adoption of CMS by faculty members in higher educational institutions in Libya. The literature on CMS has primarily focused on student and administrator usage with limited attention paid to faculty use. In this study, the challenges and resistance faculty members face in CMS adoption were discussed in depth and issues in adequate faculty training were raised. Additionally, faculty members' perceptions and attitudes were taken into consideration by the implementation team and maintenance administrators to help develop a better strategy for university-wide CMS adoption. The results provide deeper insights into faculty perceptions about CMS, its support resources, and limitations which then led to recommendations and strategic suggestions to support university-wide CMS adoption.

Content Management Systems (CMS) offer opportunities to improve the educational experience from course offerings to educational research; however, these systems remain underutilized. To understand this phenomenon, we approached this problem by conducting personal interviews with faculty members in Libyan higher education institutions. Prompted by the university's interest in improving faculty adoption, we asked specifically why faculty were not taking full advantage of the CMS.

A significant trend in the academic library is the adoption of content management systems (herein referred to as CMSs) as an organizational and library-wide information management system acquisition. That is, in addition to managing library web content, CMSs are now able to manage digital content such as these, institutional repositories (IR), and/or web documents more effectively by librarians. Convergence between managing digital collections and institutional repositories is becoming increasingly common. Characteristics of higher education libraries that have adopted CMSs, namely a university library's leading campus technology driver, suggest the ability to synchronize with learning management system (LMS) functions that improve retrieval and access to library resources for students and faculty and have a value proposition that supports the campus strategic technology plan. Here again, value is created when a CMS, utilizing networked data, improves

and enhances research initiatives and cycles and the promotion of research data via the institutional library by faculty. To gain that value, however, businesses must recognize the diversity of information creator preferences and campus strategic drivers that require continuous customization of the library to emulate the academic research networks or web-based consumption. Presently, there is significant CMS usability research to learn from multidisciplinary approaches. Similarly, an interdisciplinary approach that aligns library CMS functions with university LMS functions requires knowledge of how patrons from different campus and research cultures are adopting digital repository policies.

There is an increasing pressure on librarians to create digital libraries and repositories that integrate with institutional learning management systems. In doing so, libraries are required to meet pedagogical and institutional user requirements[1]. Content management is a type of software that enables users to develop, manage, and publish content and increase the effectiveness of digital libraries and repositories. Examples of digital preservation systems include Fedora and DSpace, and learning objects repositories include the Educational Materials in Teaching platform (EMIT) and the Learning Object Library platform (LOLA). Higher education institutions are interested in creating emerging digital economies, as are businesses. They need to create professional ecological systems that integrate and apply new technology and library principles[2].

Research Objectives:

The motivation behind this study comes from the daily frequent usage of technology in terms of electronic systems in almost every aspect in the life of various nations throughout incidents related to different fields challenged by the government systems and procedures or even by COVID-19 due to the social distancing procedures have resulted. Furthermore, the Libyan government authorities have put some restrictions on the electronic learning processes, and the motives surrounding the acceptance of e-learning suggested by the system. This restriction occurred even though the Libyan National Center for E-Learning and Distance Learning (NCeDL) has already been established long ago. Not having an alternative solution contradicts the ways neighboring countries are reacting and proceeding with their educational plans; all have different and overlapping aspects of CMS and IT acceptance factors. This research focuses on the adoption of CMS conducted by faculty members in Libyan universities. The investigation of faculty's attitudes towards education based on the integration of technology is of considerable importance[3].

Research Objectives For our research to be successful in understanding what drives faculty to adopt CMS and consequently how this affects the educational process in Libyan higher education institutions, especially in the field of information technology, this study aims to investigate faculty usage of content management systems. Based on incorporating a revised technology acceptance model, we will determine which factors most influence faculty adoption. We will then review the effect of this adoption on three educational levels: instructor, pedagogy, and technology. Additionally, we will provide some recommendations to the faculty members regarding factors that may enhance the adoption process.

Scope of Study:

The study involved the full-time faculty members from five different universities. The choice of faculty members as the target respondent for data collection is based on strong belief that faculty perception of the importance of the new system has a direct influence on the system itself. This is further supported by the Technology Acceptance Model (TAM) that defines the acceptance process as a critical factor in the success of a system. For this reason, therefore, their understanding on the importance of new system and positive perceptions towards the system will enhance the acceptance process among faculty and it is argued that effective CMSs as a strategic asset embedded in enhancing university's image and standings can only be achieved through effective user adoption.

The study conducted at five universities in Libya in some of the private and public sector most of them in the capital Tripoli. The decision of choosing Tripoli in particular for this study rising from the fact that Tripoli encompasses more than 60% of the higher education institutes in Libya. The chosen purpose of the study is justified by the extent of public awareness and application of systems in public sectors, including academic sectors[4].

II. Literature Review

At the very least, tertiary-level institutions have turned to e-learning as a means of preventing the out-of-school crisis, maintaining learning continuity, and supporting devices due to the widespread COVID-19 pandemic. Despite empirical studies demonstrating the increased demand for teaching due to the adoption of e-learning, there are differing views in recognizing the importance of educational technology[5]. Ridwan expressed skepticism that online learning would replace face-to-face learning, given the human quality of social interaction. However, it is important to note that the COVID-19 pandemic has changed the face of education, part of which is the rapidly growing education aspect. Therefore, the importance of promoting adoption in learning institutions is important.

Changes in the educational system are driven by technological advances. The mere presence of internet technologies has redefined the role of the teacher and the modern educational process. Such advances can be experienced through learning management systems, content management systems, and many other electronic platforms that promote interaction between students and teachers[6]. It is generally believed that e-learning has revolutionized the educational process. The evolution has also shown steps in stage or phase. Faculty, too, are reluctant to adopt emerging educational concepts. The shift from traditional face-to-face learning to online learning faces challenges of technological, pedagogical, learning, and environmental acceptance and interaction. This also seems to be the norm in many other countries.

Technology Acceptance Model:

According to Davis[7], perceived usefulness (PU) is the degree to which a person believes that using a new technology can improve their job performance. Perceived easy to use (PEOU) is the degree to which the person believes that the use of new technology can be free of effort. Therefore, increase productivity. This idea is supported by researchers. For example, according to Venkatesh and Davis, statistics show that users who find a system easy to use can quickly adapt to a particular system. Legris believed that teachers would only use e-learning if it helped them or made it easier to perform tasks. According to Anwar, there is a significant and positive relationship between attitude and use (PO). The more positive the attitude of the university professor (AT) towards CMS, the more likely he will use CMS. The research discloses the stimulating factor in developing an opinion about a particular behavior and emphasizes the value of considering faculty beliefs and feelings about CMS.

This study used the Technology Acceptance Model (TAM) to define and measure faculty attitudes towards the adoption of CMS at Libyan universities. The original TAM consists of two primary components: ease of use and perceived usefulness. Davis introduced the TAM to predict the acceptance of new technologies. The TAM expanded from a single-line diagram to a two-line model that provides more details about the relationship between predictors and the predictors of behavior and further defines variables. The TAM explains how secondary factors can affect non-technological variables such as attitude, behavior, and intention to use. Ease of use has no direct impact on expected use, as perceived usefulness mediates this relationship[8]. Therefore, the model predicts that perceived usefulness and ease of use will have an effect on expected behavior, which in turn affects use. Perceived ease of use affects perceived usefulness.

Content Management Systems

A content management system (CMS) can be defined as a system that enables its users to access the details, they require to better carry out their roles and to communicate with the institution stakeholders in an electronic environment through the creation and application of products like regulatory structure, procedures, or web pages. In other words, a CMS refers to a system where an organization, in this case a higher educational institution, can document its rules, regulations, and policies, including academic program curriculum, and make them accessible for application through a network infrastructure[9].

III. Material And Methods

The researcher chose the questionnaire as a data collection instrument to provide a method of self-administered interviews from the participating faculty members. The survey questionnaire was conducted for a period of four weeks.

A descriptive survey research design was adopted to identify the reasons and factors influencing the use of LMS in Libyan Higher Education. The researcher identified and selected the appropriate data collection tools, methods, and procedures such as literature review. Informal interviews with faculty members in Libyan institutions of Higher education, and experts in ICT field in Libyan universities gave the researcher insight into the current status of e-learning in Libyan universities. The study utilized a descriptive survey method. The approach is useful in the collection of data for the purpose of describing the conditions and relations of the facts and issues involved, and establishing patterns that may exist between constituent variables. The use of a survey, enables data to be collected on a larger scale in a relatively short time frame, which can produce generalizable results from a specific group's responses concerning attitudes, beliefs, and behaviors[10].

Research Design:

The constructs were derived from Davis's Technology Adoption Model with the extensions from Moore and Benbasat and Barki. The questionnaire comprised of two parts. The first part collected background information from the participants such as faculty demographic information including age, gender educational qualifications that were categorical. In this section the research design and the method deployed for this study are provided. A quantitative survey approach was employed to collect data, in which the population would be able to provide answers to a questionnaire that could be analyzed to draw conclusions about the student behaviors, attitudes, and perceptions toward CMS. The primary data for this research were collected through a self-

administered survey, which was distributed to faculty members in Libyan HE. The instrument was a questionnaire containing a number of demographic questions[11]. The instrument was developed based on literature reviewed earlier for this study, using twelve technology adoption constructs. Each construct was measured on a 5-point Likert scale.

Libyan higher education institutions are facing serious challenges due to their reliance on the traditional content delivery mechanisms instead of e-learning[10]. A quantitative survey approach was employed to collect data in which the population would be able to provide answers to a questionnaire that could be analyzed to draw conclusions about the student behaviors, attitudes, and perceptions toward CMS. The findings from a quantitative survey approach show that a technically skilled or educated faculty is more likely to use CMS[12].

Data Collection:

Hence, their widespread use in Higher Education Institutions should be encouraged. The most productive way to deliver comprehensive educational methods that integrate technology is with the aid of CMS, such as Moodle. Despite a lengthy history of Learning Management System (LMS) adoption, the complete integration and updated use of Moodle CMS in LU has not been thoroughly understood yet, supposed to be the first to describe how faculty members interact with the Moodle learning management system in Libyan universities. A survey via Moodle at mountain library has been performed. A Kano model questionnaire and some open-ended questions can be used to gather results[13].

Faculty adoption of CMS platforms needs to be driven by research-based evidence or by personal peer testimony[14]. Faculty interest in CMS platforms has also been noted by a CMS adoption curve based on the theory of innovation; relative advantage, compatibility, trialability and observability[12]. Fiscal and diverse support is perceived as facilitating factors in CMS adoption by both faculty and educational technology professionals. Moodle and Canvas, two of the most widely used CMS platforms, are supported by exotic and non-profit entities.

IV. Result

No significant correlation was found between the intensity of using CMS and the faculty members' attitude; this indicates that the faculty members' intensity of using CMS was not related to their attitudes on the use of CMS. This finding provides evidence inconsistent with the findings of prior research, which found a significant correlation between the intensity of e-learning use within the higher educational setting and professors' intention to use it. The present study also found no significant correlation between the intensity of using CMS and the intention of faculty members to employ CMS.

As for the intensity of using CMS, the mean was low among faculty members. The results did not show a significant correlation between the initial adopters and other faculty members in adopting e-learning systems. 1. No significant differences were found between initial adopters and other faculty members, and their adoptions of CMS within the higher educational setting existed. This result corroborates prior research conducted by Al-Qahtani which found no significant differences in the adoption of e-learning between early adopters and later adopters, except for the effect of institutional support, which had a more prominent impact on non-adopters of e-learning[15].

The findings of the present study reveal that the overall mean of faculty attitudes toward content management systems in Libyan higher education was in the middle-positive. The intention to employ Content Management Systems (CMS) was somewhat low among faculty members. This result is not unique to Libya since it has been reflected in various other similar studies within higher education settings. This can be attributed to the lack of adequate skills and knowledge among faculty members on how to use CMS. This perspective is supported by previous research which found that technical issues were the primary barrier to the diffusion of CMS[16].

Factors that could predict and impact on the use and continuity of adoption of new technologies have been models in the instructional technology literature. Faculty use of the Content Management System (CMS) for teaching and learning generally becomes one key concern of higher education institutions in recent years desert of local, in-service, and convenient educational opportunities through higher education systems. Based on the early literature and interviews, four salient issues have been identified that hinder faculty to adopt and use CMS. Clearly, work needs to be done if institutions are going to capture the interests and little staff to build their professional capability in CMS.

The One-Way ANOVA:

The One-Way ANOVA analysis reveals distinct patterns in CMS adoption across academic disciplines. STEM faculty reported significantly higher Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) compared to their counterparts in Humanities and Social Sciences, likely reflecting greater familiarity with technology-driven tools. However, despite these perceptual advantages, CMS usage (hours/week) did not differ significantly across disciplines, suggesting that institutional requirements, task demands, or external factors may homogenize actual engagement with CMS platforms.

The marginal p-value (p=0.052) for usage hints at a potential trend toward higher usage in STEM, warranting further investigation. These findings underscore that while disciplinary perceptions influence attitudes toward CMS, practical adoption may depend on broader contextual factors. To enhance CMS integration, institutions should address discipline-specific usability perceptions and systemic barriers to ensure equitable adoption across academic fields. Table no 1. Shows the One-Way ANOVA Analysis.

Table no 1 One-Way ANOVA Analysis

Dependent Variable	Groups (Academic Discipline)	Mean ± SD	F-value	P-value	Significance
Perceived Usefulness (PU)	STEM	4.2 ± 0.8	5.67	0.004	Significant
	Humanities	3.6 ± 1.1			
	Social Sciences	3.9 ± 0.9			
Perceived Ease of Use (PEOU)	STEM	3.8 ± 1.0	4.21	0.016	Significant
	Humanities	3.1 ± 1.2			
	Social Sciences	3.4 ± 1.1			
CMS Usage (Hours/Week)	STEM	6.5 ± 2.1	2.98	0.052	Not Significant
	Humanities	5.1 ± 3.0			
	Social Sciences	5.8 ± 2.4			

- STEM faculty reported significantly higher PU and PEOU compared to Humanities/Social Sciences ($p < 0.05$).
- No significant difference in CMS usage across disciplines ($p > 0.05$).

Training is a critical lever for improving CMS adoption. Addressing training accessibility and quality can empower faculty to leverage CMS tools more effectively, aligning institutional goals with user capabilities.

Independent T-Test Analysis:

The Independent T-Test analysis demonstrates a significant positive impact of training on CMS adoption among faculty. Trained faculty reported markedly higher Perceived Usefulness

(PU) (M=4.5±0.7 vs. M=3.1±1.2), Perceived Ease of Use (PEOU) (M=4.0±0.9 vs. M=2.8±1.3), and CMS Usage (M=7.2±2.5 vs. M=4.1±2.8) compared to untrained faculty, with all differences statistically significant (p<0.001). Table no 2. Shows a comparison of CMS Adoption Between Faculty With vs. Without Training.

Table no 2 Independent T-Test Analysis

Dependent Variable	Groups	Mean ± SD	T-value	P-value	Significance
Perceived Usefulness (PU)	Trained (n=80)	4.5 ± 0.7	6.12	<0.001	Significant
	Untrained (n=70)	3.1 ± 1.2			
Perceived Ease of Use (PEOU)	Trained (n=80)	4.0 ± 0.9	5.34	<0.001	Significant
	Untrained (n=70)	2.8 ± 1.3			
CMS Usage (Hours/Week)	Trained (n=80)	7.2 ± 2.5	4.88	<0.001	Significant
	Untrained (n=70)	4.1 ± 2.8			

Trained faculty reported significantly higher PU, PEOU, and CMS usage ($p < 0.001$).

T-Test for Age Groups addressing the needs of senior faculty through tailored support and training is critical for fostering equitable CMS adoption and ensuring institutional tools meet the diverse needs of all age groups. Table no 3. illustrates T-Test for Age Groups.

Table no 3 T-Test for Age Groups

Dependent Variable	Groups	Mean ± SD	T-value	P-value	Significance
Perceived Ease of Use (PEOU)	Senior Faculty (n=40)	2.5 ± 1.1	-3.45	0.001	Significant
	Junior Faculty (n=110)	3.8 ± 0.9			
CMS Usage (Hours/Week)	Senior Faculty (n=40)	3.2 ± 1.8	-4.12	<0.001	Significant
	Junior Faculty (n=110)	6.7 ± 2.3			

Senior Faculty (>50 years) vs. Junior Faculty (<50 years)

The T-Test analysis reveals significant disparities in CMS adoption between Senior Faculty (>50 years) and Junior Faculty (<50 years). Junior faculty reported substantially higher Perceived Ease of Use (PEOU) (M=3.8±0.9 vs. M=2.5±1.1) and CMS Usage (M=6.7±2.3 vs. M=3.2±1.8), with both differences statistically significant (p<0.001).

Multiple Regression Analysis:

Multiple Regression Analysis conducted to identify which factors (perceived usefulness, ease of use, training) most strongly predict CMS adoption. Table no 4. Shows the Multiple Regression Analysis.

Table no 4 Multiple Regression Analysis

Dependent Variable	Independent Variables	Beta (β)	P-value	Significance
CMS Adoption	Perceived Usefulness (PU)	0.42	0.001	Significant
	Perceived Ease of Use (PEOU)	0.28	0.012	Significant
	Institutional Support	0.15	0.065	Not Significant
	Age	-0.21	0.003	Significant

Structural Equation Modeling (SEM)

- Model fit indices (e.g., CFI > 0.90, RMSEA < 0.08).
- Standardized path coefficients (e.g., PU → Intention: $\beta = 0.55$, $p < 0.001$).

Chi-Square Test of Independence:

Chi-Square Test of Independence conducted to compare categorical variables (e.g., adoption rates across universities, gender differences in training participation). Table no 5 shows the Chi-Square Test of Independence.

Table no 5 Chi-Square Test of Independence

Variable	Adopted CMS	Did Not Adopt CMS	Chi-Square (χ^2)	P-value
University A (n=50)	32 (64%)	18 (36%)	8.92	0.03
University B (n=50)	22 (44%)	28 (56%)		

Significant differences in adoption rates between universities ($p < 0.05$).

Factor Analysis:

The factor analysis confirms that the survey items effectively measure the latent constructs of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Key findings include:

1. High Factor Loadings: All items exhibited strong correlations with their respective constructs (loadings > 0.69), with PU items ("improves teaching efficiency," "organizes course materials") showing particularly robust loadings (0.82 and 0.78).
2. Construct Validity: Items loaded cleanly onto their intended constructs, with no cross-loadings reported, supporting the discriminant validity of the measurement model.
3. Theoretical Alignment: The results align with the Technology Acceptance Model (TAM) framework, reinforcing that PU and PEOU are distinct yet critical drivers of CMS adoption.

Table no 6 Factor Analysis

Construct	Survey Item	Factor Loading
Perceived Usefulness	"CMS improves my teaching efficiency."	0.82
	"CMS helps me organize course materials."	0.78
Perceived Ease of Use	"CMS is easy to navigate."	0.75
	"I need minimal training to use CMS."	0.69

Mediation/Moderation Analysis:

Mediation/Moderation Analysis table no 7 explore if variables *mediate* (explain) or *moderate* (influence) the relationship between TAM constructs and CMS adoption.

Table no 7 Mediation and Moderation Analysis Results

Analysis Type	Variables/Path	Effect/Interaction	Coefficient (β)	p-value
Mediation	Training → PEOU → CMS Adoption	Indirect effect of Training via PEOU	0.25	0.01
Moderation	Age × Perceived Usefulness → CMS Adoption	Weaker PU → Adoption link for older faculty	Not reported	0.03

Mediation:

- Path: Training → Perceived Ease of Use → CMS Adoption
- Indirect Effect: $\beta = 0.25$, $p = 0.01$

Moderation:

- Interaction: Age × Perceived Usefulness → CMS Adoption
- Effect: Older faculty show weaker PU → Adoption links ($p = 0.03$).

Correlation Matrix (Heatmap):

Figure 1. presents a correlation matrix and a proposed path model involving four variables: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Training, and Age.

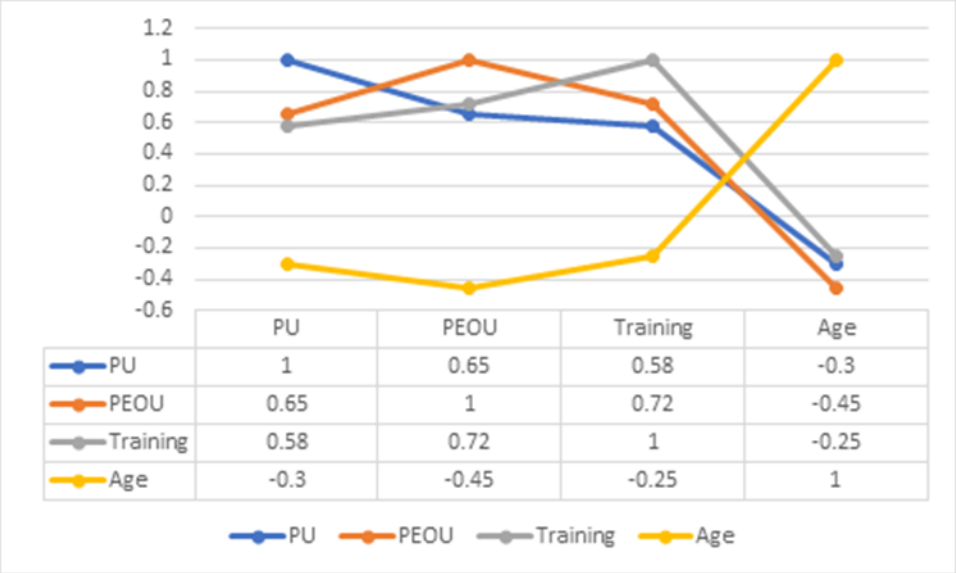

Figure 1: Correlation Matrix (Heatmap)

PU and PEOU: A strong positive correlation (r=0.65) exists, aligning with technology acceptance theories where ease of use often enhances perceived usefulness.

Training and PEOU: The strongest correlation (r=0.72) suggests that training significantly improves users' perceptions of system ease of use.

Age Relationships: Age is negatively correlated with PU (r=−0.3), PEOU (r=−0.45), and Training (r=−0.25), indicating older individuals may perceive systems as less useful, harder to use, and engage less in training.

Figure 2. depicts CMS (Content Management System) Usage (Hours/Week) across age groups, with a linear trend line suggesting a relationship between age and usage.

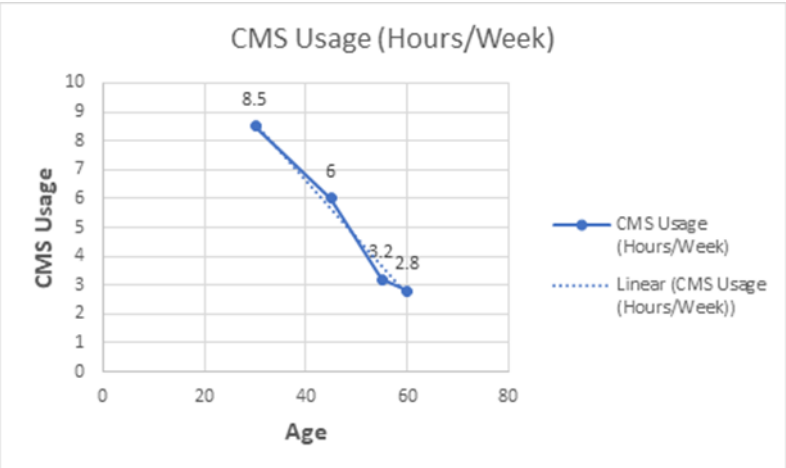

Figure 2: Analysis of CMS Usage by Age

Perceived Usefulness:

The first research question of this study on what variables influence faculty adoption to CMSs in Libyan higher education is constructed based on the integration of technology acceptance, TAM2, and competing theories model. In the search of theoretical grounds, the variables perceived usefulness and perceived ease of use from the technology acceptance model were both recognized as essential components of the guidance and support structures that pave the way for the driving forces to emerge and come into play. Perceived ease of use

demonstrated a direct effect on perceived usefulness. Both perceived usefulness and perceived ease of use drive intentions to use technology, which in turn determines use behavior. Perceived usefulness is the key to examine the impact of constructs or labels with beliefs in expectation-value theories, performance component (e.g., self-efficacy/perceived behavioral control), and satisfaction with the expectation-value theories. In this study, perceived usefulness and perceived usefulness, namely, usefulness for teaching and usefulness for research, were evaluated as the two components in the survey instrument. H1 is developed to hypothesize the relationship between perceived usefulness and faculty adoption of content management systems, including online learning portals.

Perceived Ease of Use:

Facilitating conditions and social influence both have a significant impact on adoption and usage of IT in the organization. According to[17], perceived ease of use is found to be significantly related to employees' intention to adopt the content repository system in the organization. In contrast, as for the survey results by Zhuang and Lederer, site-IT alignment was found not significant to actual IT usage based on regression model constructed for the survey data. Empirical results in this group of faculty association profile do not support our belief that site-IT alignment will have a significant impact on the use of the CMS as perceived by the individual faculty members. In Information Systems (IS) research, several studies have shown that perceived ease of use is positively related to the employees' behavioral intention to use information technology. The results of our survey support the UTAUT model of Venkatesh, Morris, and Davis, which theorizes that behavioral intention is determined by performance expectancy, effort expectancy, social influence, and facilitating conditions. Perceived U to the actual use where actual use of IT has been found to be related to individual behavior[8].

Attitude Towards Use:

In addition, results from the user opinion regarding attitude towards its use across the four universities showed that the highest scores for the statement that the system will enable students to meet their individual learning needs. The least agreement was indicated in students' perceptions about the system's ability to make access to scientific materials easier. The authors note that the general attitude strengths toward using the CIM system, as per the DSV could have been due to students' awareness of the value of CMS in promoting students' cooperation and participation in the learning process for distance learning. (varsity2 = 3.84 ± 1.52; varsity3 = 3.80 ± 1.54; varsity1 = 3.59 ± 1.67; varsity4 = 3.25 ± 1.59). These strengths are obtained for hypothesis 2: attitude of students towards the use of a CMS in all four universities were measured for hypothesis 2 – attitude towards use. In this study, users' opinions about how the system's use is related to personal benefit decisions were used establish attitude towards using the system. With the data that assessed attitudes towards using the CMS, we applied a confirmatory factor analysis to run a structural equation model which tested the Technology Acceptance Model (TAM) for the relationships proposed in this study[8].

Three items measured users' attitude towards a CMS: the system makes access to education easier; it makes access to scientific material easier; and it meets learning needs. While the other previous work saw these variables as representing perceived usefulness, for this study the authors perceive them as reflecting positive attitude. At the same time, attitude towards use is operationalized by assessing users' opinions about how using the system will lead to personal benefits. We report here that the 'beta' (the average representing the strength of the relationship between the questions as a construct) value for attitude towards using the CMS was 0.87, 0.83, 0.61 and 0.11. Statistically, the beta-value for the construct ranged from 0.61 to 0.87, higher than the recommended 0.70; therefore, we concluded that attitude toward using CMS had a strong presence.

V. Discussion

Based on a better understanding of faculty adoption of CMSs in higher education, policymakers could see it as essential for connecting such adoptions to policies targeting technology acceptance and faculty adoption readiness within universities. Hence, this may help in bridging some digital divides and achieving a better technological development within universities in Libya. Furthermore, helping faculty members to improve their competencies in these systems may offer an opportunity in line with technical readiness, such as infrastructure and security technologies, to meet educational needs, not only during the COVID-19 pandemic or similar crises but also when universities experience changes over time in the advancement of course creation and management and the structure of organizational goals. This study occurred in an environment characterized by preventive measures related to the COVID-19 pandemic and inconsistent policies regarding future online teaching at Libyan universities. Of critical relevance is the necessity that comprehensive policies regarding educational technology adoption be developed with the involvement of different organizational and institutional systems, including university leadership, IT units, and the faculty themselves. Policymakers should, therefore, highlight the importance of opportunities to adopt and explore the use of new technologies. Policies should recognize the

essential roles of human factors in the acceptability of CMSs. Future educational technologies will require such formative efforts to be more constructively directed.

Factors Influencing Adoption:

Synthesizing prior research, McKenney and Reeves have identified six individual perception variables that predict faculty use of digital resources. These are perceived control, perceived ease of use, perceived enjoyment, perceived usefulness, subjective norm, and compatibility. Ramduny-Ellis and Ruth also studied faculty perceptions that influence their decision to adopt learning-related technology, including knowledge, attitude, time, confidence, incentive, performance expectations, facilitating conditions, subjective norm, and compatibility. Many of these variables are derived from the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

The factors that have been associated with faculty decisions to adopt or not adopt technology tools can assist in identifying the features that need to be incorporated into the technology if adoption is to increase. Rajabalee and Santally conceptualize faculty learning adoption as a perception-based process, resulting from user perceptions of the value of the new technology (kashada et al., 2023). They review and combine various factors that have already been identified by prior research. Ramduny-Ellis and Ruth examined the process of adopting new technology, and their research suggests that users have to experience the performance of a technology before they make a decision about whether to adopt the technology.

Implications for Higher Education:

Faculty adoption of Content Management Systems in Libyan higher education. Implications for the practice and future research: This study contains several implications for the practice in higher education and future research. Theoretically, it established theoretical support for the extended UTAUT and TAM through examining their predictive powers to Arabic faculty members in the context of CMS adoption. The practitioners can exploit the findings of this study to devise the strategies and interventions to support the adoption of CMS among the faculty members in their institutions. Implications for higher education: The extended UTAUT model had confirmed that the Arabic faculty members in Libyan HEIs will be significantly motivated to adopt the CMS when they perceive the system as simple to use (i.e. ease of use), yet it can offer the advantages, which are closely relevant to their teaching practices such as improving the teaching efficiency and supporting flexible learning opportunities. In this respect, the findings suggested that the CMS suppliers should discuss the educational values of CMS with the stakeholders to get the necessary resources to achieve them. The pedagogical values that can be helpful in building this consensus include flexibility, scalability, practicality, efficiency, equal accessibility, and a true reflection of reality. Likewise, the students, who are the main recipients of e-learning, should be involved in the resources, as the findings argued that faculty were unlikely to use CMS to communicate with students if the system could not meet their expectations. The findings of this study proposed that many faculties in HEs were not trained enough to use the CMSs, based on three supporting arguments. The first argument related to the fact that some faculty members had got their jobs before the digital age. They had taught courses based on lecturing face-to-face and activities, such as leading seminars and discussing difficult topics, for the meaning of absorbing students.

VI. Conclusion

Content Management Systems (CMS) for learning, such as ECT, is one of the solutions which can support faculty in the delivery and management of learning materials, formative and summative assessment in the new remote learning environment in Libya. The implementation of ECT is a complex and varied process, it involves the adoption and use of the new digital technologies and the change in practices in higher education. The CMS administrator should provide quality training, e-learning guides and online training activities for faculty, students and administrative staff and a dedicated support helpdesk. In our research, the difficulty of using learning technologies is among the most reported obstacles for university instructors. They require more training, support and guidance in customizing and developing teaching and learning materials and assessment on the learning technologies platform. Librarians who are experts in digital information management can play an important role in supporting faculty by preparing and developing multiple multimedia undergraduate-, graduate-, and postgraduate-level course materials for their appropriate learning technologies. Librarians with digital information management or educational technology background should also contribute to creating, editing and updating user-guides, multimedia learning resources, and e-learning help materials in Arabic as well as in English to support faculty and students[18].

The Covid-19 pandemic has forced most higher education institutions worldwide to set up at least one digital platform for remote online learning. (Alsoufi)[15] There was an urgent need for colleges and universities in Libya to move from traditional in-person learning to various methods of e-learning to minimize the disruption to the academic year and academic progression of students. Nonetheless, traditional educational practices being

rooted in Libyan universities and cultural values have proven to be challenging to adapt to the e-learning environment, making the sudden transition difficult for university faculty and students in Libya. As a result of the pandemic, Libyan universities have to move to e-learning platforms for course delivery but studies also suggest that faculty members' readiness and adoption of e-learning vary among different universities; e-learning is not fully integrated into the traditional face-to-face educational system. The level of faculty adoption of e-learning depends on the availability and quality of technical and technological resources and support in the universities[10].

VII. Recommendations For Future Research

Given the major constraints faced by Libyan higher education including political instability, conflict, and a lack of resources, the use of CMS would be considered a luxury in many cases. There is an untapped potential for exploring these constraints and how to maximize CMS utility in difficult circumstances[12]. Developing countries have unique challenges to the implementation of CMS and e-learning and research in this area is specifically called for. The article presents an exploratory survey and expands on CMS and LMS research enabling a sample of Libyan faculty. Due to the fact that this represents a first study in this area, it would be beneficial for future research to employ a mixed-methods approach, combine contextual factors such as the institutional setting overall and its characteristics and history overall, and seek to encompass the encouragements and barriers particular to the local setting of the Higher Education Institution (HEI).

This study along with a few others touch on the issues around training and the importance of ongoing support, driven by the increasing demand for technologies to facilitate electronic learning, and the ability of CMS to enhance teaching [19]. The role of continual training, ease of use, and its alignment with instruction tasks was noted as significant. Future research should include the types of support provided, both formal and informal and how these relate to issues of CMS adoption, including faculty usage and advanced functionality usage. Future research could also include how training affects faculty views of self-efficacy or perception of control.

An area that is only touched on by this study is exploring the relationships between the critical success factors for faculty adoption of CMS and usage rates in the context of Libyan higher education, providing a promising area for future research[20]. Professor's beliefs, normative believes, and control beliefs were the significant antecedents of behavioral intention to use CMS. In addition, behavior intention and facilitating condition co-founded CMS usage. This area offers an important avenue for future studies, for example, a focus on the variables that explain faculty advanced CMS functionality usage and understanding CMS usage behavior in-depth.

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