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The Integration Of Artificial Intelligence In Regional Centers For Education And Training Professions (Crmefs): A Qualitative Exploratory Study Of The Technology Acceptance Model (Tam).

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Abstract:
The growing evolution of artificial intelligence (AI) has profoundly transformed methods of training and teaching. However, the effectiveness of its integration into the training process of education and training professionals within Regional Centers for Education and Training Professions (CRMEFs) will largely depend on the acceptance of this technology by these trainee professionals.
The integration of artificial intelligence within CRMEFs requires a thorough analysis of the factors influencing its adoption. In this perspective, this article is primarily committed to shedding light on this approach by using the Technology Acceptance Model (TAM) as the main framework of study, enabling the explanation of individual behavior towards the use of artificial intelligence.
The results of the exploratory qualitative study, based on semi-structured interviews with various influential actors in the integration of artificial intelligence within CRMEFs, have enriched our understanding of the integration process of this technology. The collected data underwent content analysis, combining a thematic and lexical approach. The study revealed that the integration of artificial intelligence within CRMEFs is closely linked to the perception of its usefulness, ease of use, and satisfaction of trainee teachers.
Key Word: *Artificial intelligence; Technology acceptance; Integration of AI; TAM model.*

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I. Introduction

Artificial intelligence is becoming increasingly important in the development of teaching and training methods aimed at preparing future education leaders. However, its success within the Regional Centers for Teacher Training (CRMEF) of the Moroccan Ministry of National Education will depend on the adoption of this technology by various users.

In this perspective, artificial intelligence (AI) plays an increasingly crucial role in the development of skills among professionals, covering several essential domains. AI promotes personalized training tailored to the specific needs of each trainee teacher, automates certain tasks related to skill assessment and interactive activities. Furthermore, through specific algorithms, AI can anticipate the future training needs of trainee teachers based on technological advancements.

This approach appears to represent the future of leadership training as it has the potential to revolutionize how we educate these young professionals. With the increasing number of trainee teachers within the CRMEFs, trainers and administrative managers are faced with a growing workload, underscoring the importance of being able to handle large amounts of data and provide real-time analysis. In this context, the use of modern technologies such as artificial intelligence proves to be indispensable. However, integrating artificial intelligence into the development of the training process for trainee teachers within the Regional Centers for Education and Training Professions (CRMEFs) sometimes presents pedagogical and didactic challenges. Indeed, it cannot fully replace the essential role of the trainer. Nevertheless, artificial intelligence could offer numerous advantages for the training of young trainee teachers.

This leads us to wonder what could encourage young trainee teachers to engage in the process of artificial intelligence. It is precisely about understanding the attitudes of trainers, young trainee teachers, and CRMEF(s) officials towards this technology and their motivations, aiming to identify factors that could accelerate the integration of artificial intelligence within the CRMEF(s).

II. Conceptual Framework

According to Bobillier Chaumon (2016) [1], the analysis of the acceptability of a technology aims to evaluate or predict the motivations and conditions likely to ensure the acceptance of said technology by potential users. To analyze user attitudes, several models have been developed to study the acceptance and intention of individuals to adopt new technologies in the field of information systems. In this framework, four researchers (Venkatesh, Morris, Davis, and Bala) collaborate to examine technology acceptance models.

Davis (1989) attempted to determine the factors influencing individuals' decision to accept or reject information technologies through the Technology Acceptance Model (TAM). This model is considered an extension of Fishbein and Ajzen's Theory of Reasoned Action [2]. The TAM model is based on a theoretical framework that allows analyzing the impact of perceived usefulness and ease of use of a new technology or service on its adoption. When Davis (1989) initially proposed the TAM model, it was designed as a theory explaining technology adoption. Since then, it has been applied in various fields, including new technologies and services, as noted by Venkatesh (2006) [3] . In 2006, King and He [4] confirmed that the TAM model is the most widely used by scientific research to assess the acceptability of technologies.

With the advancement of scientific research, the TAM model has undergone two significant mutations: TAM2 (Venkatesh and Davis, 2000) [5] (researchers attempted to integrate external determinants of perceived usefulness through a longitudinal study conducted in four organizations) and TAM3 (Venkatesh and Bala, 2008) [6] (authors tested eight different theoretical models representing the paradigm of technological acceptance, aiming to eliminate four determinants of the intention to accept a technology). These determinants include perceived usefulness, perceived ease of use, facilitating conditions, and satisfaction, respectively. In general, these two extensions of the TAM model are considered a significant reinforcement of Davis's work (1989).

Perceived Usefulness

Conceptually, perceived usefulness (PU) is defined by Davis (1989) as the degree to which a user believes that using a system would enhance their performance in the future. According to Lin, Chen, and Fang (2011) [7], perceived usefulness can be described in the context of our analysis as the degree to which trainers, young trainee teachers, and CRMEF(s) officials believe that the integration of artificial intelligence can help them achieve the training objectives.

In the context of our study, the expectation confirmation paradigm suggests that the perception of the usefulness of artificial intelligence by trainers, young trainee teachers, and CRMEF(s) officials could have a positive effect on their satisfaction with this technology. By closely examining the perception of usefulness, we can formulate the following hypothesis: perceived usefulness has a positive impact on the use of artificial intelligence in CRMEF(s).

Perceived Ease of Use

Venkatesh, Morris, Davis, and Davis, F. D (2003) [8] defined perceived ease of use (PEOU) as the degree to which a user perceives that using a system would be simple. In Birch's [9] study on the acceptability of information and communication technologies (ICT) among a sample of 82 students engaged in a teacher training program, perceived ease of use is identified as the only factor significantly associated with the intention to use ICT in the classroom. Therefore, perceived ease of use appears to be the primary determinant of the intention of trainee teachers, trainers, and officials to engage with artificial intelligence. By analyzing perceived ease of use thoroughly, we can hypothesize the following: Perceiving increased ease of use has a positive effect on the use of artificial intelligence in CRMEF(s).

Facilitating Conditions

Venkatesh, Morris, Davis, and Davis, F. D (2003) defined social influence as the degree to which an individual perceives it is important for others to believe that he or she uses the new system. Empirically, Nikou (2021) [10] has validated that facilitating conditions significantly influence the perceived ease of use by users. In this context, a favorable environment in CRMEF(s), characterized by developed technological infrastructure and quality technical support for trainee teachers and trainers, constitutes an important facilitation for the integration of artificial intelligence. Considering this integration, we could formulate the following hypothesis: Facilitating conditions provided to trainee teachers and trainers have a positive effect on perceived ease of use.

Satisfaction

The absence of a conceptual framework integrating the various dimensions of satisfaction mentioned in the literature makes it extremely difficult to formulate a comprehensive theoretical definition of this psychological concept (Yennek, 2015) [11]. In management sciences, and theoretically, satisfaction plays a crucial role in ensuring sustainability and encouraging the intention to use products by customers. Similarly, in the literature on

information systems, the Expectation Confirmation Model (ECM) considers satisfaction as a powerful determinant of system continued use. Empirically, Nikou (2021) has shown that user satisfaction can be a crucial determinant of continued use and full adoption of technology. By thoroughly analyzing user satisfaction, we can hypothesize the following: Trainee teachers' satisfaction has a positive effect on the integration of artificial intelligence in CRMEF(s).

III. Research Methodology

The exploratory qualitative study is of paramount importance as it allows for a deeper understanding of the process of artificial intelligence adoption by trainee teachers, trainers, and CRMEF(s) officials. According to Quivy and Van Campenhoudt [12], the aim of such a study is not to validate research hypotheses but rather to shed light on the object under study. In the context of this research, we will analyze the content of interviews conducted with trainee teachers, trainers, and officials, aiming to provide insights into our problem statement.

Methodological Approach

In the context of our research, we have chosen a method based on questionnaires, preceded by exploratory interviews conducted with the various actors involved in our study. Blanchet and Gotman[13] specify that "exploratory interviews aim to highlight aspects of the phenomenon that the researcher may not spontaneously think of and to complement the working hypotheses suggested by their readings" (p.43). We attempted to incorporate the contributions of the interviewees into a qualitative approach targeting trainee teachers, trainers, and CRMEF(s) officials. This approach focused on collecting judgments and opinions from these stakeholders regarding the use of artificial intelligence within CRMEF(s), aiming to gather a wide range of rich and varied information. The objective was to collect their judgments and opinions on the integration of artificial intelligence within CRMEF(s) and to gather as much rich and diverse information as possible.

Field of Investigation

Our exploratory qualitative research is characterized by its small size, composed of actors specifically selected for their ability to provide relevant information on explanatory factors for the integration of artificial intelligence within CRMEF(s). To obtain a diversity of perspectives and a varied representation of motivations, we have chosen three categories of actors. Firstly, we have included trainee teachers and trainers working within CRMEF(s). Next, we have sought the participation of CRMEF(s) officials.

Interview Preparation

We followed the recommendations of Fontana and Frey [14], who specify that "the researcher should start by breaking the ice with general questions, then gradually move towards more specific questions" (p. 660).

In our research, we opted for a semi-structured approach with open-ended questions. This method allows for gathering detailed information while remaining focused on the study's objectives. We ensured anonymity, confidentiality, and the return of interview transcripts to create a trusting atmosphere conducive to exchanges with participants. Additionally, our study sample consists of forty-two trainee teachers, twenty-six trainers working within CRMEF(s), and ten CRMEF(s) officials. Table 1 presents the study sample along with the main characteristics of the officials, trainee teachers, and trainers interviewed.

Table 1: Main characteristics of trainee teachers, trainers, and officials working within CRMEF(s)

Characteristics	Number of respondents	Age	Overall Seniority	%
Trainee Teachers	42	Under 25 years old	----------	67%
		Between 25 and 30 years old	----------	33%
Trainers working within CRMEF(s)	26	Between 30 and 40 years old	Under 15 years old	7%
		Between 40 and 50 years old	Between 15 and 30 years old	38%
		Over 50 years old	Over 30 years old	55%
Officials (Directors of CRMEF)	2	50-60 years old	Over 30 years old	20%
Officials (Deputy Directors of CRMEF)	8	40-60 years old	More than 20 years old	80%

The interview guides each comprise ten open-ended questions, addressing the degree of involvement of each participant in the use of artificial intelligence as well as their opinions on the determinants of its integration within CRMEF(s). We encouraged the participants to respond freely to the questions while following the interview guide. However, in some cases where the responses were not aligned with the order of questions in the guide or when the interviewee spontaneously addressed relevant topics, we made adjustments by reformulating

the answers. These actions aimed to facilitate communication with the interviewee, make them feel comfortable, or clarify certain ambiguous notions.

Data Processing Methodology

We have chosen a dual approach for the analysis of our data, which combines thematic content analysis with lexical analysis. Thematic analysis aims to enrich lexical analysis by examining the meaning of discourse through the identification of main themes and their relationships. These discourse processing methods involve quantitative analysis for a better understanding of the collected data.

Giannelloni and Vernette [15] emphasize that textual analyses enrich qualitative approach by integrating a quantitative dimension to data interpretation, while preserving nuances for in-depth analysis. With this in mind, we used the "Sphinx Lexica" software to automate the required processing. This decision stems from our desire to highlight elements and characteristics that may escape manual content analysis.

Thiétart [16] asserts that content analysis techniques are based on the idea that the repetition of discourse elements, such as words, expressions, or similar meanings, reveals the interests and concerns of the actors (p. 502). Furthermore, according to Berelson [17] content analysis is a research technique aimed at objectively, systematically, and quantitatively describing the explicit content of communications, for the purpose of interpretation. Furthermore, Mucchielli, [18] argues that content analysis aspires to be a method capable of fully and objectively exploiting informational data (p. 24). The distinction is made between syntactic analysis and lexical analysis, which focus on the structure of discourse and vocabulary elements, and thematic analysis, which concerns the meaning of units. Evrard, Pras, and Roux [19], present content analysis as a set of techniques, which they describe using Table 2:

Table 2 : Types of Content Analysis

Analysis Type	Examples of indicators
Syntactic analysis	Discourse structure. Example : verb tenses and moods
Lexical analysis	Nature and richness of vocabulary. Example: frequency of word occurrence
Thematic analysis	Segmentation by theme and frequency of occurrence

Next, we used thematic analysis to identify the main themes discussed by the participants as well as any potential relationships between them. This method involves using the unit of meaning as the unit of segmentation, coding, and analysis. Consequently, thematic content analysis requires segmenting the text into basic units of analysis, grouping these units into coherent categories, and then quantifying their frequencies of occurrence according to predetermined rules. The content analysis process involves three key steps: choosing the unit of analysis, defining categories, and coding.

IV. Results Of The Analysis

An in-depth analysis of the transcribed discourses has shed light on the numerous gains that CRMEF actors associate with the use of artificial intelligence, as well as the perceived risks and drawbacks regarding its adoption. The examination of these risks and drawbacks has also led us to reflect on the success criteria for the integration of artificial intelligence into CRMEFs.

Theme 1 : The gains perceived by CRMEF actors through the use of artificial intelligence

The analysis focuses on the various perceived benefits of using artificial intelligence, as identified by CRMEF administrators, trainee teachers, and trainers. Upon initial data analysis, it became apparent that these three groups largely agree on most of the benefits of using artificial intelligence in CRMEFs. By consolidating all ideas regarding these benefits and after several exchanges, four relevant categories have emerged. When participants were asked about the gains they associate with artificial intelligence, their responses led to the following categories:

The first identified category is "**Access to Information**" AI technologies can facilitate access to a vast amount of information and online educational resources, thus helping trainee teachers deepen their understanding of the subjects studied.

The second highlighted category is "**Personalization of Learning**" AI can customize educational content based on the individual needs of each trainee teacher, thereby enabling a more personalized and effective training experience.

The third revealed category is "**Task Automation**" AI can automate certain pedagogical, administrative, and repetitive tasks such as automated assessment grading, generation of personalized reports, and other pedagogical tasks, thereby freeing up time for more meaningful training activities.

Finally, a fourth highlighted category is "**Personalized Feedback**" AI systems can provide trainee teachers with personalized feedback on their pedagogical practice, identifying strengths and areas for improvement, and offering recommendations for continuous professional development.

The various categories of benefits associated with the use of artificial intelligence are outlined in Tables [3,4,5], as deduced from the interviewees' discourses, by consolidating all ideas related to the categories of benefits associated with the use of artificial intelligence along with the four categories considered appropriate.

Table 3: The gains perceived by CRMEF trainers through the use of artificial intelligence.

	Interviews	Access to information	Personalization of Learning	Task Automation	Personalized feedback	Total number of units
The gains that CRMEF trainers perceive through the use of artificial intelligence.	1	1	1	6	3	11
	2	5	2	1	2	10
	3	3	1	4	3	11
	4	1	1	2	2	6
	5	5	2	2	3	12
	6	4	5	4	2	15
	7	2	1	3	3	9
	8	2	1	4	3	10
	9	3	2	1	2	8
	10	1	1	4	3	9
	11	2	2	2	2	8
	12	3	2	2	3	10
	13	2	1	2	2	7
	14	2	2	2	2	8
	15	1	1	4	3	9
	16	2	1	2	2	7
	17	4	2	2	3	11
	18	2	3	3	3	11
	19	2	3	3	2	10
	20	3	2	3	4	12
	21	2	2	2	1	7
	22	2	1	2	1	6
	23	3	2	3	1	9
	24	4	1	2	2	9
	25	2	1	2	2	7
	26	4	1	3	1	9
	Sum	67	44	70	60	241
	%	28%	18%	29%	25%	100%
	Rank	2	4	1	3	

Table 4: The gains perceived by trainee teachers through the use of artificial intelligence.

	Interviews	Access to information	Personalization of Learning	Task Automation	Personalized feedback	Total number of units
The gains perceived by trainee teachers through the use of artificial intelligence	1	3	2	4	1	10
	2	3	4	2	3	12
	3	2	2	5	2	11
	4	2	3	3	5	13
	5	5	2	2	3	12
	6	4	5	4	2	15
	7	3	4	3	3	13
	8	2	1	4	3	10
	9	3	2	1	2	8
	10	2	3	4	3	12
	11	2	2	2	2	8
	12	3	2	3	3	11
	13	2	2	2	2	8
	14	2	2	2	2	8
	15	3	2	4	3	12
	16	2	1	2	2	7
	17	4	2	2	3	11
	18	4	3	3	3	13
	19	2	3	3	2	10
	20	5	2	2	3	12
	21	4	5	4	2	15
	22	2	1	3	3	9
	23	2	1	4	3	10

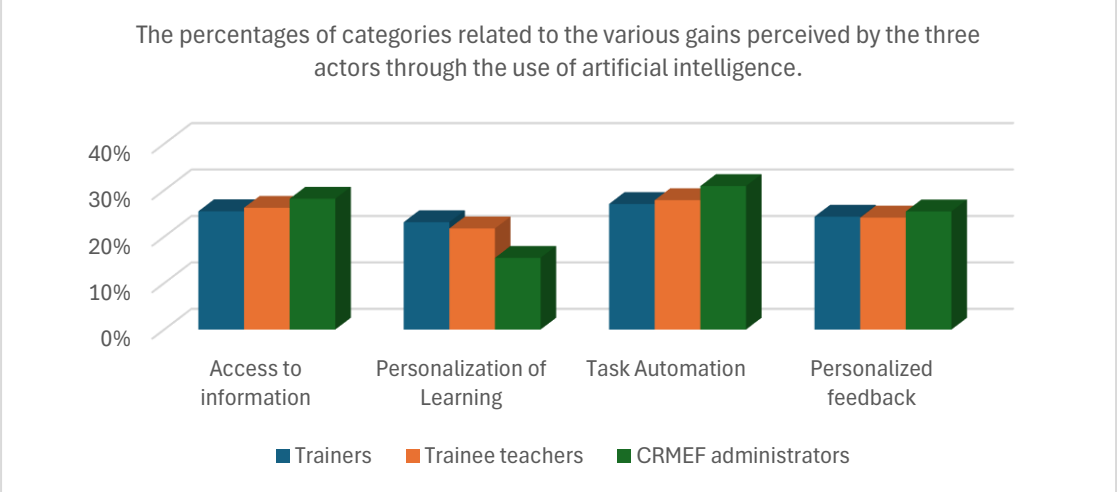
	24	3	2	1	2	8
	25	1	1	4	3	9
	26	2	2	2	2	8
	27	5	2	2	3	12
	28	4	5	4	2	15
	29	2	3	3	3	11
	30	2	2	4	3	11
	31	1	2	1	2	6
	32	1	1	4	3	9
	33	2	2	2	2	8
	34	3	2	3	4	12
	35	2	2	2	1	7
	36	2	1	2	1	6
	37	3	2	3	1	9
	38	4	1	2	2	9
	39	2	1	2	2	7
	40	2	2	2	2	8
	41	3	3	5	4	15
	42	2	1	3	1	7
	Sum	112	93	119	103	427
	%	26%	22%	28%	24%	100%
	Rank	2	4	1	3	

Table 5: The gains perceived by CRMEF administrators through the use of artificial intelligence.

	Interviews	Access to information	Personalization of Learning	Task Automation	Personalized feedback	Total number of units
The gains perceived by CRMEF administrators through the use of artificial intelligence	1	2	1	4	3	10
	2	4	2	3	2	11
	3	2	1	4	4	11
	4	1	1	3	2	7
	5	5	2	3	2	12
	6	5	5	4	2	16
	7	4	1	3	4	12
	8	4	1	4	4	13
	9	3	2	2	2	9
	10	1	1	4	3	9
	Sum	31	17	34	28	110
	%	28%	15%	31%	25%	100%
	Rank	2	4	1	3	

The previous tables illustrate the percentage and ranking of each category of gains that the three CRMEF actors perceive through the use of artificial intelligence. The intersections of the cells represent the number of appearances of a unit in the respondents' discourses. The percentages of categories related to the various gains perceived by trainee teachers, trainers, and CRMEF administrators through the use of artificial intelligence are summarized in Figure 1:

The figure 1: The percentages of categories related to the various gains perceived by the three actors through the use of artificial intelligence.



According to the results in Figure 1, it's evident that trainers, trainee teachers, and administrators consider task automation as one of the primary gains. This automation provides them with the opportunity to enhance training efficiency, personalize teacher training, and free up more time for value-added activities. Additionally, access to information through artificial intelligence and the task automation associated with this technology allows various CRMEF actors to benefit from gains in AI usage. Therefore, once adopted, this technology can be continuously utilized to optimize processes.

Finally, personalized learning enables trainers and trainee teachers to respond more effectively to their specific needs, thereby fostering their motivation, engagement, and success.

Thème 2 : The risks and drawbacks associated with AI

The risks and drawbacks associated with artificial intelligence (AI), as expressed in the interviewees' discourses, are described based on the theoretical framework as well as the experiences of trainers and CRMEF administrators. The responses identified several categories of risks:

Firstly, **excessive dependence on AI** can make CRMEFs vulnerable to system failures, cyber attacks, and malicious manipulations.

Secondly, **the risk of algorithmic bias** is emphasized, as AI algorithms can be influenced by harmful data, leading to discriminatory or unfair decisions.

Thirdly, the **loss of human interaction** is highlighted, with the concern that automating certain aspects of training may lead to a decrease in human interaction, which is essential for effective training. Trainee teachers may need the support, encouragement, and feedback of a human trainer to progress optimally.

It is crucial to recognize that the introduction of educational AI technology in CRMEFs presents not only advantages but also risks and drawbacks. These challenges were raised during the interviews and require serious consideration. The various risks and drawbacks associated with AI are grouped in Tables [6,7,8], reflecting the ideas expressed by the interviewees and classified according to these three categories.

Table 6: The risks and drawbacks associated with AI perceived by trainers.

	Interviews	Excessive dependence on AI	The risk of algorithmic bias	Loss of human interaction	Total number of units
The risks and drawbacks associated with AI perceived by trainers.	1	4	3	3	10
	2	5	3	2	10
	3	3	4	6	13
	4	4	2	6	12
	5	4	3	5	12
	6	3	4	5	12
	7	4	4	5	13
	8	4	5	4	13
	9	3	4	6	13
	10	2	1	5	8
	11	4	5	7	16
	12	1	5	5	11
	13	3	1	4	8
	14	1	3	6	10
	15	4	5	5	14
	16	4	6	4	14
	17	3	2	5	10
	18	1	4	6	11
	19	3	5	4	12
	20	3	5	3	11
	21	5	5	5	15
	22	3	2	2	7
	23	2	4	3	9
	24	4	4	5	13
	25	3	4	4	11
	26	2	5	4	11
	Sum	82	98	119	299
	%	27%	33%	40%	100%
	Rank	3	2	1	

Table 7: The risks and drawbacks associated with AI perceived by trainee teachers.

	Interviews	Excessive dependence on AI	The risk of algorithmic bias	Loss of human interaction	Total number of units
	1	2	5	4	11
	2	1	6	4	11

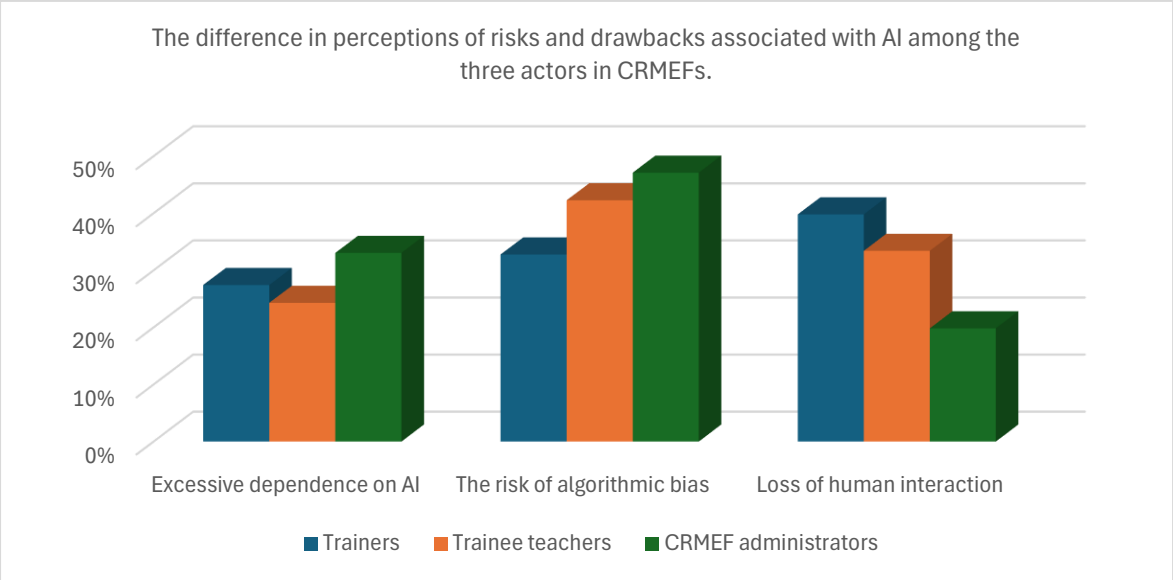
The risks and drawbacks associated with AI perceived by trainee teachers.	3	2	5	3	10
	4	1	4	5	10
	5	3	6	4	13
	6	3	5	5	13
	7	3	4	3	10
	8	2	4	4	10
	9	3	5	4	12
	10	1	5	3	9
	11	3	3	3	9
	12	2	5	4	11
	13	2	2	2	6
	14	3	2	2	7
	15	2	2	4	8
	16	1	1	2	4
	17	3	2	2	7
	18	4	3	3	10
	19	3	3	3	9
	20	3	2	2	7
	21	3	5	4	12
	22	4	3	3	10
	23	2	4	4	10
	24	1	5	1	7
	25	2	3	4	9
	26	1	4	3	8
	27	3	4	2	9
	28	2	5	4	11
	29	3	4	3	10
	30	1	5	4	10
	31	2	3	1	6
	32	1	5	4	10
	33	2	4	2	8
	34	2	5	3	10
	35	3	3	3	9
	36	3	4	4	11
	37	2	5	4	11
	38	3	5	2	10
	39	1	3	2	6
	40	3	4	2	9
	41	2	4	4	10
	42	3	6	3	12
	Somme	96	167	132	395
	Pourcentage	24%	42%	33%	100%
	Rang	3	1	2	

Table 8: The risks and drawbacks associated with AI perceived by CRMEF administrators.

	Interviews	Excessive dependence on AI	The risk of algorithmic bias	Loss of human interaction	Total number of units
The risks and drawbacks associated with AI perceived by CRMEF administrators.	1	4	6	3	13
	2	5	5	2	12
	3	4	6	1	11
	4	4	6	3	13
	5	3	7	2	12
	6	4	5	3	12
	7	4	6	3	13
	8	5	4	3	12
	9	2	6	1	9
	10	5	6	3	14
	Sum	40	57	24	121
	%	33%	47%	20%	100%
	Rank	2	1	3	

The previous tables provide an illustration of the percentage and ranking of each category of risks and drawbacks associated with AI, as perceived by trainee teachers, trainers, and CRMEF administrators. The intersections of the cells represent the number of appearances of a unit in the respondents' discourses. The percentages of different categories of risks and drawbacks associated with AI, from the perspective of trainee teachers, trainers, and CRMEF administrators, are synthesized in Figure 2

Figure 2: The difference in perceptions of risks and drawbacks associated with AI among the three actors in CRMEFs.



According to the results from Figure 2, the risks and drawbacks associated with the use of artificial intelligence in CRMEFs, as perceived by trainers, notably include the loss of human interaction. In the absence of human presence to provide support, feedback, and encouragement, trainee teachers may be less motivated to actively engage in their training. Therefore, it is crucial for trainers and AI system designers to find a balance between automation and maintaining meaningful human interactions in the educational context.

However, the risk of algorithmic bias is often perceived as one of the main drawbacks associated with the use of artificial intelligence in training, as perceived by trainee teachers and CRMEF administrators. This risk can lead to unfair decisions, decrease trust in automated assessment systems, and pose challenges in terms of detecting and correcting biases. Therefore, it is essential to adopt practices and policies aimed at mitigating the risks of algorithmic bias and ensuring fairness in assessment.

Theme 3 : Success criteria for the integration of artificial intelligence in CRMEFs.

The development of the artificial intelligence project must take into account the success criteria for its integration into CRMEFs. A thorough analysis of the interviews has led us to conclude that these success criteria require the engagement of CRMEF actors across four key categories: An initial category identified concerns the **involvement of trainee teachers**. Artificial intelligence technologies should contribute to maintaining a high level of engagement among trainee teachers by providing interactive and stimulating pedagogical activities, while also delivering regular and motivating feedback. Secondly, **data security** is an essential category to ensure the success of integrating artificial intelligence into CRMEFs. It is crucial to ensure the security and confidentiality of trainee teachers' data in compliance with relevant regulations. Thirdly, **optimizing administrative and pedagogical processes** is recognized as a crucial category for the success of integrating artificial intelligence into CRMEFs. Thanks to this technology, various administrative and pedagogical tasks such as enrollment management, course planning, and examinations scheduling can be automated. This automation frees up time for trainers and administrative staff, allowing them to focus more on essential pedagogical activities. Finally, a fourth highlighted category is **continuous assessment and strategy adjustments**. It is crucial to regularly monitor the effectiveness of AI solutions implemented by collecting data on their impact on trainee cadre training, and adjusting strategies accordingly.

The following tables [9,10,11] present the number of units related to success criteria for the integration of artificial intelligence into CRMEFs as perceived by each category (trainers, trainee teachers, and CRMEF administrators).

Table 9: Success criteria for the integration of artificial intelligence into CRMEFs perceived by trainers.

	Interviews	Involvement of trainee teachers	Data security	Optimization of administrative and pedagogical processes	Continuous assessment and strategy adjustments	Total number of units
	1	5	3	3	4	15
	2	6	4	3	3	16
	3	6	6	3	4	19

Success criteria for the integration of artificial intelligence into CRMEFs perceived by trainers	4	4	2	1	5	12
	5	4	3	3	5	15
	6	4	4	3	5	16
	7	5	5	5	5	20
	8	4	4	3	4	15
	9	5	3	2	6	16
	10	5	5	4	5	19
	11	4	2	3	4	13
	12	3	3	5	3	14
	13	4	5	6	4	19
	14	5	3	2	5	15
	15	6	5	4	5	20
	16	5	6	5	4	20
	17	6	2	5	4	17
	18	4	4	5	4	17
	19	4	5	2	4	15
	20	6	5	4	3	18
	21	5	5	4	5	19
	22	5	2	6	2	15
	23	4	4	5	3	16
	24	3	4	3	5	15
	25	5	4	4	4	17
	26	6	5	5	4	20
	Sum	123	103	98	109	433
	%	28%	24%	23%	25%	100%
	Rank	1	3	4	2	

Table 10 : Success criteria for the integration of AI in CRMEFs perceived by trainee teachers.

	Interviews	Involvement of trainee teachers	Data security	Optimization of administrative and pedagogical processes	Continuous assessment and strategy adjustments	Total number of units
Success criteria for the integration of AI in CRMEFs perceived by trainee teachers.	1	2	4	6	3	15
	2	1	3	6	5	15
	3	2	5	5	4	16
	4	1	4	5	4	14
	5	3	4	6	3	16
	6	3	3	5	4	15
	7	3	5	4	6	18
	8	2	4	5	3	14
	9	3	4	5	3	15
	10	1	5	6	5	17
	11	3	3	4	4	14
	12	2	5	5	4	16
	13	2	6	6	2	16
	14	3	3	4	2	12
	15	2	6	5	4	17
	16	1	3	4	2	10
	17	3	4	6	2	15
	18	4	3	4	3	14
	19	3	5	4	3	15
	20	3	4	5	2	14
	21	3	3	5	4	15
	22	3	4	4	3	14
	23	2	3	4	4	13
	24	1	3	5	1	10
	25	2	3	4	4	13
	26	1	3	4	3	11
	27	2	4	5	2	13
	28	2	3	5	4	14
	29	3	5	4	3	15
	30	1	4	5	4	14
	31	2	3	4	1	10
	32	1	4	5	4	14
	33	2	3	4	2	11
	34	2	3	5	3	13
	35	3	5	6	3	17
	36	3	4	4	4	15
	37	2	6	5	4	17
	38	3	3	5	2	13
	39	1	5	4	2	12

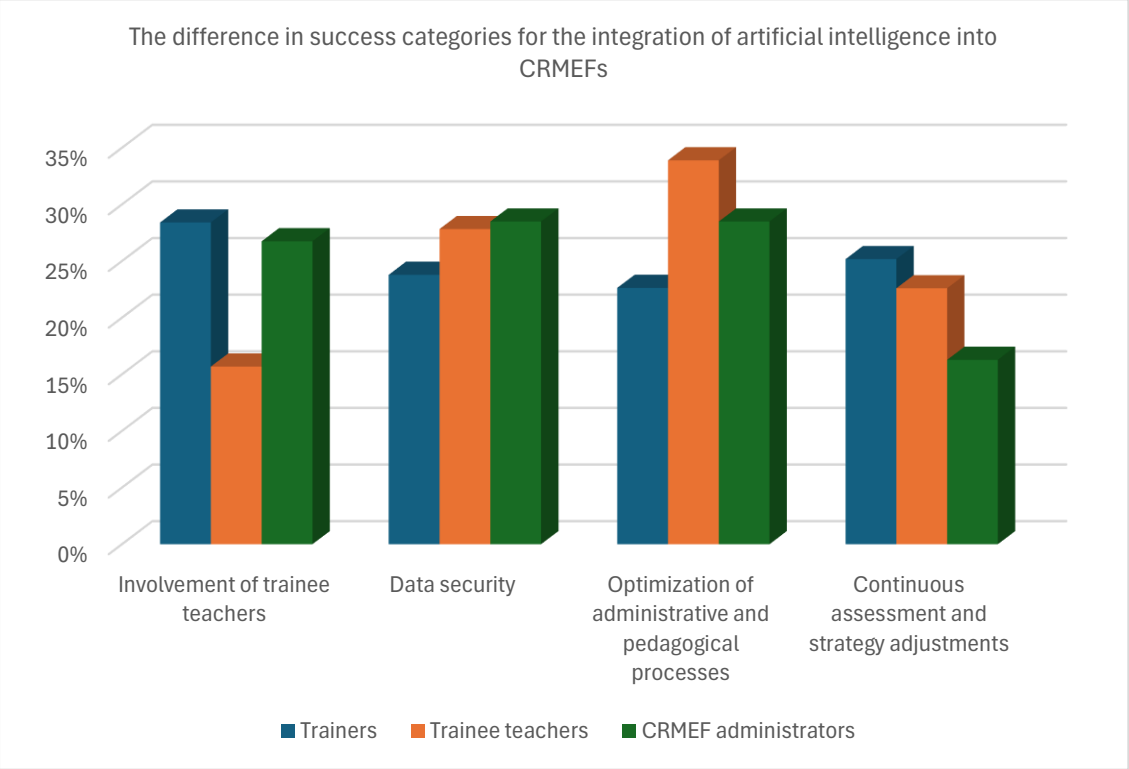
	40	3	3	4	2	12
	41	2	4	4	4	14
	42	2	4	6	3	15
	Sum	93	165	201	134	593
	%	16%	28%	34%	23%	100%
	Rank	4	2	1	3	

Table 11: Success criteria for the integration of AI in CRMEFs perceived by administrators.

	Interviews	Involvement of trainee teachers	Data security	Optimization of administrative and pedagogical processes	Continuous assessment and strategy adjustments	Total number of units
Success criteria for the integration of AI in CRMEFs perceived by administrators.	1	4	5	6	2	17
	2	5	6	4	4	19
	3	4	6	5	2	17
	4	4	4	5	3	16
	5	6	5	6	1	18
	6	5	5	4	4	18
	7	5	6	6	3	20
	8	4	4	4	4	16
	9	4	4	5	2	15
	10	5	4	4	3	16
	Sum	46	49	49	28	172
	%	27%	28%	28%	16%	100%
	Rank	2	1	1	3	

The previous tables provide an illustration of the percentage and ranking of each success category for the integration of artificial intelligence into CRMEFs, as perceived by trainee teachers, trainers, and CRMEF administrators. The intersections of the cells represent the number of appearances of a unit in the respondents' discourses. The percentages of different success categories for the integration of artificial intelligence into CRMEFs, from the perspective of trainee teachers, trainers, and CRMEF administrators, are synthesized in Figure 3.

Figure 3: The difference in success categories for the integration of artificial intelligence into CRMEFs.



The results presented in Figure 3 clearly indicate that administrators and trainee teachers attach great importance to the optimization of administrative and pedagogical processes in the context of integrating artificial intelligence into CRMEFs. This process optimization is perceived as one of the key success factors, due to its

potential benefits in terms of operational efficiency, service quality, and stakeholder experience. Thus, it is an essential criterion for the success of training institutions.

However, according to trainers, the involvement of trainee teachers is considered a primary category for the success of integrating artificial intelligence into CRMEFs. This perspective is based on the fact that this technology facilitates the training and professional development of trainee teachers, while also influencing organizational culture and fostering pedagogical innovation.

V. Discussion Of The Results Of The Exploratory Study:

It is necessary to assess the main benefits of using artificial intelligence in the Regional Centers for Education and Training Professions (CRMEFs), as well as the risks and drawbacks associated with this technology, and finally the success criteria for its integration into CRMEFs as a shared belief by trainers, trainee teachers, and CRMEF administrators, as determined in our three qualitative studies.

The majority of trainers, trainee teachers, and CRMEF administrators consider task automation, access to information through artificial intelligence, and personalized learning as the main benefits. This automation provides them with the opportunity to improve the effectiveness of training and personalize the learning of trainee teachers. Additionally, access to vast amounts of information and educational resources online through this AI technology can facilitate the understanding of subjects studied by trainee teachers. Finally, AI can adapt educational content according to the individual needs of each trainee teacher, thus enabling a more personalized and effective learning experience. This explains why the various stakeholders only accept artificial intelligence if they perceive its utility relative to the needs of their daily work and its impact in terms of gains in performance and pedagogical productivity. These categories emerge in line with the determination of perceived usefulness, which has an effect on the integration of artificial intelligence according to the Technology Acceptance Model (TAM).

Among the success criteria for integrating AI into CRMEFs, a fourth category is the ease of use of this technology, especially regarding "Personalized Feedback." AI systems can provide trainee teachers with personalized feedback on their teaching practice, identifying strengths and areas for improvement, which promotes consistency with the determinant of perceived ease of use, having an effect on the intention to integrate AI into CRMEFs according to the Technology Acceptance Model (TAM).

Among the risks and drawbacks associated with the use of artificial intelligence is excessive dependence on this technology. When different stakeholders become excessively reliant on AI, they may find it easier to use this technology to accomplish certain tasks rather than performing them themselves. Additionally, they may perceive this technology as extremely useful in meeting their needs. This perception of ease of use and usefulness of AI can be reinforced by the fact that this technology is capable of automating complex processes and making decisions rapidly. This promotes consistency with the determinants of perceived ease of use and perceived usefulness, thus affecting the intention to integrate AI according to the Technology Acceptance Model (TAM).

The majority of trainers, trainee teachers, and CRMEF administrators consider the risk of algorithmic bias and the loss of human interaction as drawbacks associated with the use of artificial intelligence. These categories can influence users' attitudes towards the use of the technology. If users perceive that artificial intelligence is affected by biases or errors, and if this leads to a decrease in human interaction, their attitude towards adopting this technology may become more critical. They may be less inclined to adopt or continue using the technology if it does not meet their expectations in terms of reliability and accuracy. This observation demonstrates that the perceived usefulness of trainee teachers towards artificial intelligence is influenced by the approval of their peers, primarily from their colleagues, regarding its usage. Thus, it is possible to conclude that when trainee teachers receive positive feedback and encouragement from their colleagues, they consider the use of AI to be significant. This conclusion confirms that social influence has a positive impact on the perceived usefulness of trainee teachers, which supports the hypothesis of our conceptual model. These results contribute to reinforcing consistency with the determinant factors of perceived ease of use, perceived usefulness, and attitude towards use, according to the Technology Acceptance Model (TAM). They thus influence the intention to integrate AI into CRMEFs.

Based on the feedback from trainers, trainee teachers, and CRMEF administrators interviewed, it is observed that the involvement of trainee teachers in this process can influence their perception of the usefulness and ease of use of AI in CRMEFs. These conclusions reinforce the notion that the perceived usefulness also influences future decisions regarding the use of AI in CRMEFs. To understand this hypothesis, it is crucial to recall that the perceived usefulness of AI in CRMEFs evaluates to what extent this technology enhances educational performance. However, post-acceptance satisfaction depends on the experiences encountered by trainee teachers, whether they are positive, neutral, or negative. Paradoxically, lower-than-expected performance during the initial use of AI is likely to create a negative experience and, therefore, dissatisfaction among trainee teachers. This leads us to accept that validating the satisfaction of trainee teachers has a positive effect on the integration of artificial intelligence into CRMEFs.

The results of the exploratory study presented lead to a qualitative study to understand the attitudes of trainers, administrators, and trainee teachers towards this technology and their motivations, aiming to identify factors that could accelerate the integration of artificial intelligence into CRMEFs.

VI. Conclusion:

Information systems research deeply focuses on interpreting and clarifying the issue of technology acceptance from the users' perspective. Indeed, information systems cannot enhance the performance of institutions if they are not sufficiently accepted by end users.

The advancements in artificial intelligence can open new perspectives in the training of young student teachers within the Regional Centers for Education and Training Professions (CRMEF) in Morocco.

The results of this article have significant managerial implications that should be of interest to decision-makers at CRMEF(s) as well as educational stakeholders in the educational system, particularly the actors within the Regional Centers for Education and Training Professions (CRMEF). We have proposed the TAM model to identify key factors favoring the integration of artificial intelligence into CRMEF(s). This exploratory qualitative study was primarily chosen to better understand the subject of the integration of artificial intelligence in CRMEF(s) and to refine the research problem. We analyzed the content of the interviews with trainee teachers, trainers and CRMEF(s) managers, and we tried to provide answers to our problem.

Following this analysis, several conclusions were formulated, contributing to a better understanding of the phenomenon of the integration of artificial intelligence in CRMEF(s).

The analysis of the results of this exploratory qualitative study has allowed us to identify several benefits that the stakeholders of CRMEF(s) perceive through the use of artificial intelligence. These benefits emerge in coherence with the determinants that have an effect on the integration of artificial intelligence into CRMEF(s) according to the TAM model. Similarly, several risks and drawbacks associated with AI have been identified by the interviewees, also in coherence with the determinants affecting the integration of artificial intelligence into CRMEF(s) according to the TAM model.

Additionally, we have also analysed the success criteria for the integration of artificial intelligence into CRMEF(s), mentioned by the student teachers, trainers, and CRMEF(s) managers, which are also in coherence with the determinants affecting the integration of artificial intelligence into CRMEF(s) according to the TAM model.

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