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Female Pre-Service Kindergarten Teachers Perceptions about E-Learning Environment at Taif University Based on Gamification Strategy and Electronic Academic Passion

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Abstract: The current study is to determine the perspectives of female pre-service kindergarten teachers at Taif University in the Saudi Arabian Kingdom (KSA) regarding the e-learning environment based on gamification approach and its relationship to their motivation in virtual academic pursuits. An analysis of a sample study of (60) female students in the childhood development section at Ranyah University College, Taif University, Saudi Arabia Kingdom, is done using a narrative method to explore the perspectives regarding the e-learning environment. According to the results, the sample study's evaluations of the online learning environment and academic enthusiasm are at increased rates, but obsessive passion is at an expected standard. Gamification has been cited as one of the most significant concepts in e-learning. The ability of gaming features to promote learning, skill development, and behavioral shifts toward more determine the needs is widely accepted by scholars. The findings also showed a statistically significant (positive correlation) link between the sample's enthusiasm for academics and their impressions of the e-learning field based on gamification method. Sentimental analysis-based Machine Learning (ML) with Support Vector Machine (SVM) was used to categorize the opinions of the teachers. The most recent findings may be utilized to visually depict the strengths and defects based on the teachers' positive and negative feedback.

Keywords: E-learning environment; gamification; machine learning; support vector machine.

1 Introduction

The biggest difficulty in the process of learning is finding better ways to inspire students. Gamification of teaching methods is a systematic technique that has gained traction in recent years and makes advantage of peoples' love of playing video games. In recent times, e-Learning has emerged as the answer to overcoming the limitations of both location and time in teaching. Since the academics began working on increasing eLearning's efficacy, the eLearning approach has evolved significantly from instruction to learning [1]. In comparison to previous decades, students in the system of education now have distinct learning outcomes. Being a technological native, this generation demands virtual learning platforms and devices that can offer content when needed, along with a personalized interaction with the lecturers [2].

Communication and information technology is regarded as perhaps the most cutting-edge research areas due to the quick steps it has made to increase human quality management system. One of the well-known research areas that have emerged recently is gamification; however, there is still a lot of uncharted territory in this subject. The usage of mobile devices in the classroom and the integration of gamification and multimedia instructional ideas are two areas that need more attention if the latest components are to be enhanced [3].

Although the term "gamification" was first presented by Nick Pelling in 2002, the strategy has been utilized in establishments since the early 20th century. A wide range of critical games incorporate gamification. One of the most recent developments in user interaction assistance is gamification. The techniques of gamification are well used in sales and economics, but the use of gamification has been expanded to include a larger range of applications and to influence several academic subjects.

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In order to support the process of learning, coming up the idea of gamification in education is a development [4].

Gamification is a purposeful strategy used to keep and inspire consumers by emulating the video game play in behaviors, services, organizations, and technologies. This is often achieved by incorporating elements of game design and game mechanics in contexts that are unrelated to games [5]. The majority of studies on gamification suggest it has good effects on people, according to a compilation of gamification research. Gamification makes boring and uninteresting instructional information fascinating and entertaining.

The most common explanation for gamification is ”the use of game principles and interface architecture to technologically connect and inspire individuals to accomplish their objectives. Some researchers differentiate loyalty from video games and gamification schemes because it makes use of behavioral science methods to ”nudge” individuals toward their objectives. Therefore, gamification methodologies can be used in many various contexts, such as loyalty cards for price reductions in stores, frequent flyer programmers, travel guides for gathering stamps, when browsing historic and cultural sites, etc., in addition to teaching, where students do indeed accomplish their objectives [6].

The process of learning is levelled, presenting many learning sections with materials and exercises that must be completed. The introduction to the learning course gives an intriguing background for the tasks needed. The game regulations are used to teach the learning rules. Every learning activity or assignment that needs to be completed in order to meet the level’s learning objectives presents a challenge to the students at each level. While some of the missions need students to work alone, others require teams of learners. Fig. 1 denote the phases of learning in gamification.

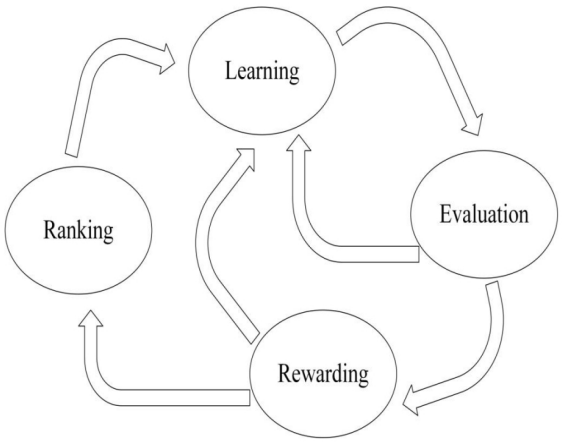

Fig. 1: Gamified learning methodology with four levels

Participation is emphasized as a concept in e-learning. It makes the notion that collaboration and interaction should be encouraged during the learning experience. Even if e-Learning is one of the most cutting-edge approaches to education, it still lacks emotional resonance with the individual. One of the most modern disciplines that is adding to the massive amount of data being produced is e-learning [7]. The use of digital devices and technology for learning new knowledge and skills is known as e-learning. One element of the e-learning method is education, which enables individuals to exchange knowledge despite restrictions and geographic borders. The overview of e-learning has shown in Fig. 2.

In order to explore the points of view of female pre-service kindergarten teachers at Taif University in the Saudi Arabian Kingdom (KSA) regarding the e-learning environment that focuses on gamification strategy and its relationship, this study used SA to evaluate teachers’ perceptions and feelings toward the e-learning system.

The remaining subsections are organized as follows: The topic’s literature review is covered in the second section. Section 3 provides an explanation of gamification and online learning. Section 4 describes how sentiment analysis-based ML and SVM were used to classify the teachers’ perspectives. In part 5, the effectiveness and performance of the suggested method were evaluated; the results were displayed in tables and graphs. The last section provides a summary of the Conclusion.

2 Literature Review

The paper [8] was to find out how students felt about the teaching environment as it related to digital resources. (40) St. Clare’s College students from Malta who have used web technologies as a learning tool were included in the study. The majority of these kids are growing in their personal development as they cooperate in teams and cooperate with their peers during their developmental actions, according to the data. A small number of pupils do not understand the convenience and value of playing gamification at school, nevertheless. According to the study, children appear to have various capabilities because they have distinct learning styles.

The study [9] was to determine how the gamification method had an effect on learning engineering. The sample included some college students. The usefulness of gamification in enhancing learning engineering among the survey was demonstrated by the results. Enhancing the curricula in science, technology, engineering, and mathematics is a promising strategy. Developing a multi-criteria framework for generating test questions in an e-learning environment that incorporates gamification, taking into account that tests play a significant part in measuring the progress of learners. The application of gamification in learning method engineering, according to the results, improved student engagement, elevated amounts of accomplishment, and learning [10].

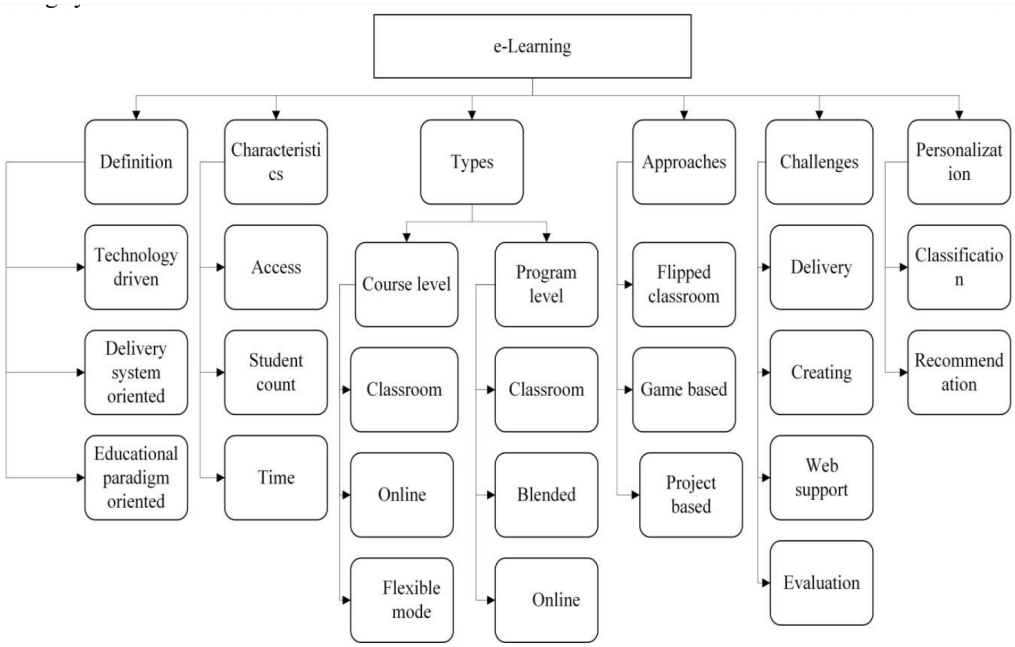

Fig. 2: The over view of e learning

To create a completely interactive learning environment, [11] combined coach feedback, a real-time pattern of scored examinations, and live scripting. Scientific evidences from the gamification sample was examined to data from a controlled participants who received training using a conventional teaching style, comparable to the one that had been employed during earlier cohorts, in order to evaluate the influence of gamification on learning. The gamified method was inspiring and interesting for both instructors and students in a number of crucial indicators, including participation, course material eBooks, and academic achievement, spite of the fact that this was a recent sample.

The paper [12] utilized Class Dojo as a tool to help students identify their behavior during guided reading time and ultimately self-monitor it. The researchers discovered that Class Dojo had a favorable effect on the behavior of their students. The current study coincides with earlier studies in that it employs the gamification method, but it differs from them in that it focuses on how the gamification strategy's impressions of the e-learning environment interact with e-academic passion. Research on academic gamification has drawn on a variety of theoretical frameworks, including some that support the principle of intrinsically motivated.

The constructivist philosophy, which holds that learning is created by observational learning and goal orientation, is also aligned with the gamification technique. Gamification serves a number of learner requirements, including innovation, reward, success, cooperation, competitiveness, self-expression, and reducing stress, so it is also congruent with the human relations approach. Gamification sets clear requirements for learners and encourages self-regulation by giving them opportunity to practice it. Gamification is compatible with engaged development theory as well. In a gamified setting, the learner exerts effort on their own to gain experience, which boosts motivation and enhances the rate and effectiveness of learning. Activities that motivate individuals to participate in collaborative learning are also included in gamification [13].

To encourage more involvement with the learning context resources and boost performance effectiveness, media resources can be used more frequently in e-learning environments. The principle of passion was described by [14] as a durable propensity toward an activity that people enjoy, find significant, and invest time and energy in. The two passions they proposed were pleasant and compulsive. Compulsive passion is the task control of other personal desires so that the operation that enjoys impacts the performance of the other accomplishment parts required. Harmonic passion is the self-absorption that influences people to decide to engage in the task additionally, the internal struggle and tension between one's passion and other facets of life has a detrimental effect on one's psychological and cognitive state.

Their dual notion of passion is founded on the self-determination theory, which highlights the factors that motivate people's actions and have an impact on their self-decisions. According to this idea, people have three fundamental wants that they want to have met:

competency, relatedness, and independence. In light of the aforementioned, the person experiences enthusiasm when engaging in activities that enable him to be effective and independent, and he subsequently develops a connection to these actions, the surroundings, and the people associated with them. People can experience compassion in both of its dimensions to differing degrees, and each dimension can be thought of as its own distinct entity.

A case study involving bloggers who used the Microsoft Longhorn Blogosphere, The [15] research sought to determine the impact of blogging practice on weblogs on igniting neural passion. The findings demonstrated that using weblogs increases behavioral interest in reading entries, leaving comments on them, and writing them. The responses and comments of readers who are engaged with the blog provide external cues and observations that support and nourish the flow of interest. The study [16] was to investigate the connections between effective teaching practices, congruent enthusiasm, deep learning techniques, and mathematical cognition.

The study of [17] attempted to discover the characteristics of harmonious and obsessive passion and their link to academic accomplishment in a sample of (460) manlike students. When the latent profile was analyzed, it was discovered that the sample contained four different profiles: high sense of harmony passion and compulsively passion, moderate harmonious passion and intense desire, low pleasant desire and obsessive passion, and high sense of harmony passion and low intense passion. The students exhibit strong academic achievement in the later profile, which is seen to be ideal. According to the findings, extremely intelligent students exhibit both a in elevation level of harmonized passion and a low level of compulsive passion; however, they occasionally switch between the two patterns.

The study [18] used to determine The association between academically excitement and academic engagement is moderated by the positive impact of academic passion on academic engagement, the moderating role of academic self-efficacy, and the role of the teacher. The findings indicated a positive relationship between academic passion and academic engagement, a moderating effect of individuals ' self on this correlation, and a moderating effect of instructor continuous feedback on the academic achievement enthusiasm and student outcomes. These results demonstrated that the richer the developing knowledge, the larger the favorable association among academics drive and higher grades [19].

3 Gamification and e-learning

The core of personalization is not technologies, but rather a diverse learning context, a system of choices, and prizes that are all designed to boost participation and drive in the process of learning. Improved performance, usefulness, engagement, student happiness, and motivation are the primary goals of online learning. Game mechanics and gamification can be used to accomplish these goals [20]. E-learning administration must foster an environment where students are engaged, content, productive, and effective. An essential component of the concept is the administration of e-learning [21, 22]. The outline of gamification into the field of e-learning has shown in Fig. 3.

The foundation of any higher education e-learning approach that incorporates gamification must be sound management. Organization, planning, staffing, leadership, and control are all essential components of effective e-learning administration. Educational, technological, design, administrative, human, financial, and gamification components are crucial components of e-learning [23].

The goal of the gamification-based e-learning approach for advanced education is to increase students' pleasure, inspiration, effectiveness, and efficiency. This paradigm incorporates current pedagogical ideas and e-learning best practices [24].

3.1 Study Terms

Gamification Strategy:

The gamification technique has numerous levels and must-achieve goals. Each level consists of a number of academic units with instructional material that is assessed in terms of difficulty based on the state of the learner. Numerous digital awards, such as a label, a particular badge, or membership on an honor board, are also a part of the gamification strategy. According to his network of education stages, each learner has an avatar. According to the flow hypothesis, which is also consistent with gamification, people can learn higher-level skills and feel more excitement when they are connected to and given more time to focus on the activities and elements of gamification. When they do well, it appears that students are in a dynamic state at its peak, which boosts their confidence and brings internal clarity to their learning objectives [25].

3.2 Sample characteristics and data collection

The research tools were put into use during the 1442/1443Hj second academic term (2021/2022 A. D.). A random sample of (60) female students in the eighth level of the early childhood section at Ranyah University College-Taif University branch was chosen to assess the psychometric properties of the qualitative research. Their standard error is, and their age is 21.74 on average (2, 15).

4 Methodology

It describes a set of methods for classifying perspectives as impartial, positive, or negative.

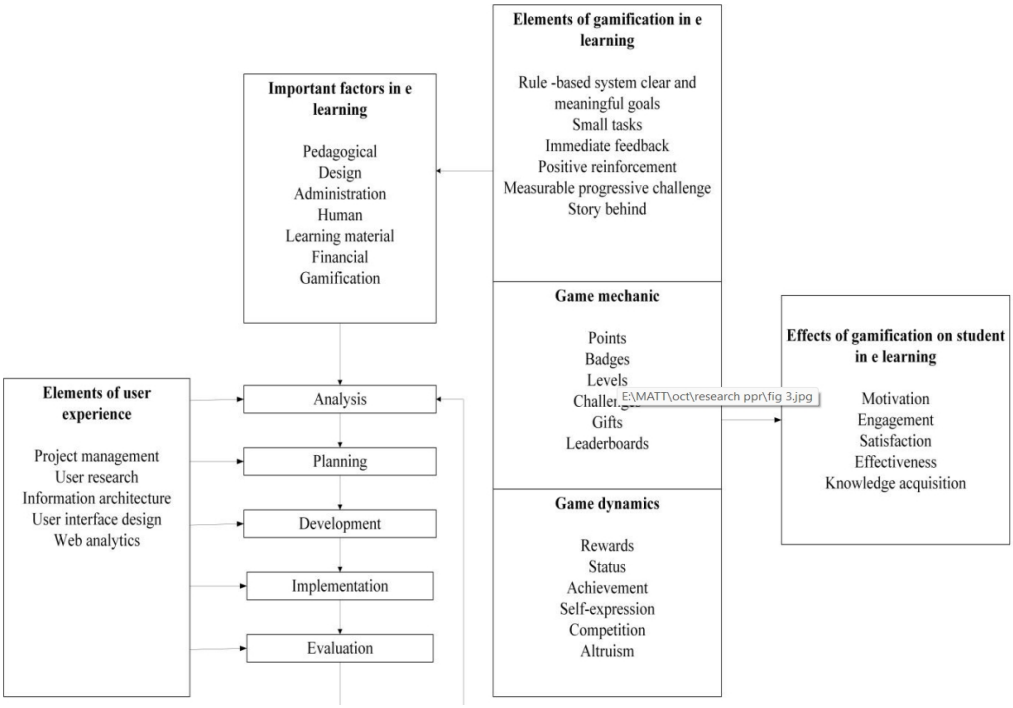

Fig. 3: The use of gamification to the area of online learning

Corporations and companies can utilize the study of these opinions to inform decision-making by learning what consumers think of their brands, services, and product attributes. The vocabulary structure, which uses a vocabulary of both positive and negative texts to figure out the overall sentiment, the ML method, which integrates both methodologies, ML based tactic, and the hybrid version are the three main approaches used for SA recognition.SA categorization ML algorithms that successfully estimate the achieving required for each example in the data constitute a powerful and efficient method of data classification. A specific technique known as a classifier is used to conduct the classification. Examples of classifiers include stocktickerSVM, NB, ME, KNN, and BN.

Furthermore, supervised learning and unsupervised learning techniques are available for sentiment classification utilizing ML methodologies. The SVM method was used in the research process to train the models that assist in identifying the content-value combination and determining views. The results showed that the deployment of ML with a high standard of research accuracy to gather thoughts and SA would considerably contribute to the creation of e-learning systems. Fig. 4 describe the An ML strategy based on SA classification

Another approach for classification process is support vector machines (SVM). It looks for the ideal higher dimensional space that keeps the labeled data farthest away from the nearest point by the greatest margin. In comparison to the regression analysis technique, it is a stronger and more limited classifier. With this approach, a new instance known as the hinge loss function is employed in place of the linear regression used in logistic regression.

Rapid Miner software relies on the ML technique. There are several phases involved in classifying data using ML systems. After gathering the dataset, the first phase is to pre-process the information using NLP-based methods. Then, using feature extraction, sentiment-related characteristics are isolated. The model's suitability can be assessed using accuracy, precision, recall, and the F-measure once it has been trained utilizing ML classification approaches (F1-score). The regression model, which provides the true values of the right forecasts and actual drawbacks, is also used to evaluate the classifier's efficiency on the testing data. Fig. 5 depicts the technique procedure, and the following subsections provide detailed explanations of each stage.

There are several technologies available for collecting and analyzing data to learn more about web material for a particular objective. After contrasting Rapid Miner with programs like Weka and R, the decision was made to use Rapid Miner to analyses the data. The decision was made based on the tool's effectiveness, usability, and accessibility of numerous features that set it apart from

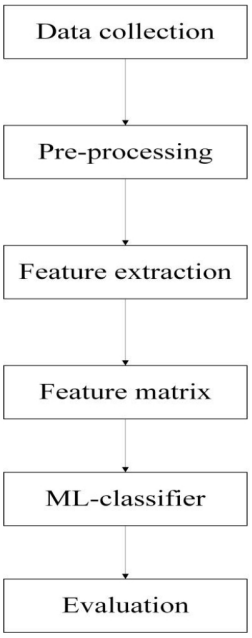

Fig. 4: An ML strategy based on SA classification

other products on the market. It is a data-mining tool that is open-source and used in data science. It offers a seamless environment for ML, pretreatment of data, text mining, modeling, data modeling, assessment, and implementation.

Here, an SVM strategy is introduced to forecast both positive and negative attitudes from data about how university students perceive online learning and to base choices on the chosen support vectors. Using feature vectors, the data set is taking the initiative as either positive or negative. The classification then employs these matrices as learning data to find similar characteristics and categories the data into a certain group. The Classification algorithm uses the training data set to teach and train itself about the characteristics that make text unique, and the test dataset is used to evaluate the classifier's effectiveness. The Perplexity Matrix shown in Table 1.

Table 1: The Confusion Matrix.

Positive	**Accurate positive forecast**	**True Positive**
Wrong positive forecast	False Positive	
Negative	Accurate negative forecast	False Negative
Wrong negative forecast	True Negative	

Accuracy, recall, precision, and F-measure are these measurements. The most significant and often used

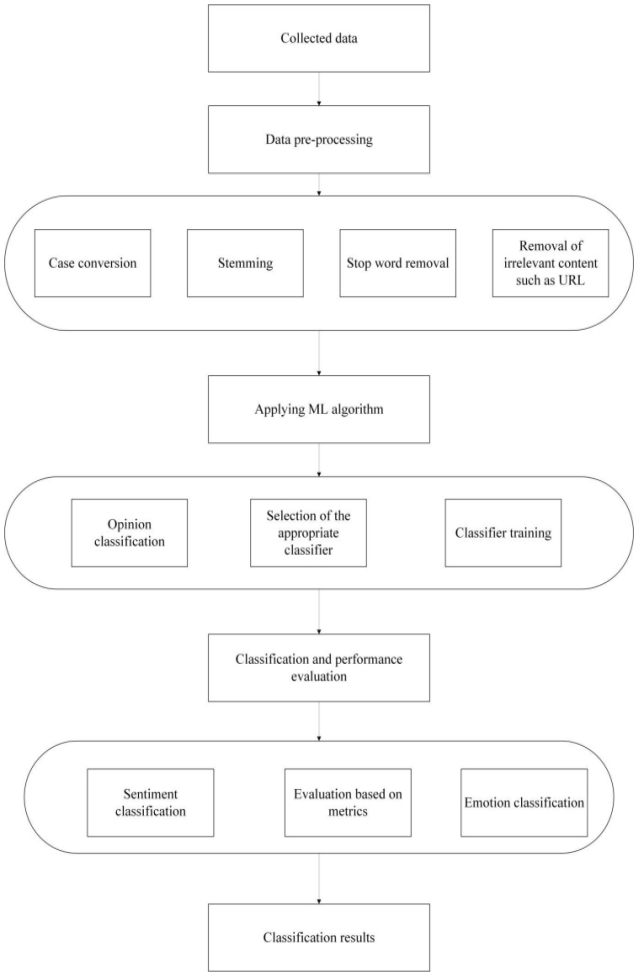

Fig. 5: Methodology Procedures of the technique

classification process metric is accuracy, which is defined as the proportion of all accurate classifications to all datasets. While precision implies the exactness of the classification consequence and can be characterized as the ratio of true positives to the total number of positive aspects that are estimated, recall assesses the comprehensiveness of the classification model consequence and makes reference to the ratio of appropriate optimistic to all positive aspects in the dataset. Precision and recall are combined in F-Measure, also known as F1-Score. The F1-Score is particularly useful because it offers a single metric for comparing a system's recall and precision. The result of binary categorization is either positive or negative. Utilizing the following Eq. (1), (2), (3), (4), to calculate the four metrics:

$$Accuracy = \frac{TP+FN}{FN+TN+TP+FP} \quad (1)$$

$$precision = \frac{TP}{TP + FP} \quad (2)$$

$$Recall = \frac{TP}{TP + FN} \quad (3)$$

$$F1 - score = \frac{2 \times Precision \times Recall}{Precision + Recall} \quad (4)$$

They were divided into both positive and negative categories in the first phase; in the second stage, multi-sentiment scores were added using the NRC sentiment dictionary.

5 Results

The SA-based ML technique was applied to investigate pupils' perceptions of several e-learning systems. More than 15,000 opinions were gathered from the teacher, and 1, 2010 of those were used in the final dataset for SA. Before sending the polished data to the classifier, each opinion must undergo extensive processing procedures during the pre-processing phase. Additionally, the data was split into subjective and objective viewpoints in order to remove that did not express a strong view and could have a detrimental impact on the effectiveness and accuracy of the classification. Thus, strong opinions became the subject of attention.

As a result, it can be said that using Twitter as a source of opinions to comprehend individuals' perspectives of educational systems and assess learning and instruction procedures generally is somewhat supported. Opinion statements appear to make up a significant portion of all sentences. Table 2 denotes the Classification of Opinions.

Table 2: The Classification of Opinions.

Opinion sorting	Percentage
Subjective	52.32 %
Objective	46.69%

In order to categories the data into classes for sentiment analysis, the SVM model was trained. The gathered data were divided into positive and negative labels for educational purpose. Training data set and Test set were created using the collection of 1201 training data set. The test set contained a representative selection of 20% of the data used to evaluate the classification results, while the training set had 80% of the chosen at random data required to train and verify the model. Based on the projected labels from the testing dataset, the classification algorithm was trained using these labels. The function of sentiment analysis was also examined by 10-fold cross validation, and the recall, precision, accuracy, and F-Measure numbers were used to gauge its effectiveness.

Precision and recall performance metrics for SVM-based classifications are shown in Table 3 and recall, accuracy, precision, and F-measure metrics are shown in Table 4, respectively. Presentation Visualization has shown in Fig. 6.

Table 3: The accuracy and recall metrics used to evaluate the performance of SVM-based classifiers.

Metrics	Significance
Positive Recall	94.13 %
Negative Recall	67.95%
Positive Precision	82.77 %
Negative Precision	82.64 %

Table 4: The Performance of the classifier.

Metrics	Significance
Accuracy	83.73 %
Avg. Recall	63.89%
Avg. Precision	84.83 %
F-Measure	72.67 %

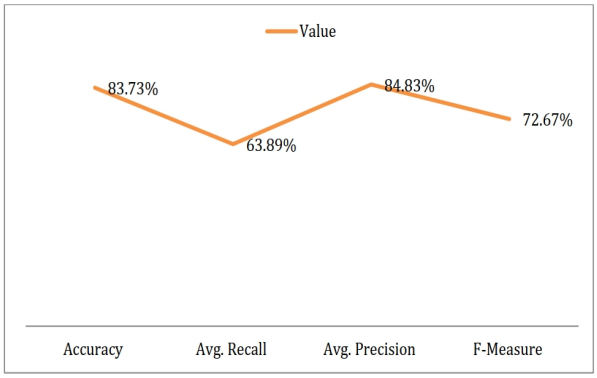

Fig. 6: Visualization of Performance

The study's findings also demonstrated that the SVM classifier can accurately identify positive and negative attitudes, and its overall performance may be regarded as excellent. Therefore, when used for SA categorization in different education contexts, notably e-learning, SVM classifier delivers the best accuracy results. It might be suggested that applying SA-based ML procedures in educational environments could be helpful in detecting learning issues and understanding relevant concerns founded on the posts and comments made by teachers on

social networks, where they are free to express their thoughts. By contrasting the outcomes and results of the SVM classifier during the investigative process with those of earlier studies that employed it, its trustworthiness was demonstrated. In Taif University in the Saudi Arabian Kingdom, the findings showed that most teachers have favorable thoughts regarding e-learning based gamification, as shown in Table 5.

Table 5: The results of sentiment prediction by SVM classifier.

	True positive	True negative	Class precision
Pre. Positive	739	155	81.72%
Pred. negative	39	245	83.60%
Class recall	92.13%	61.88%	

Particularly, 65% of the results are positive and 35% are in favor. The promising results showed that when students have access to the required assets, a solid internet assembly, and information exchange with their peers and teachers, they are satisfied and gain unique welfares from e-learning systems. The model's estimate over the dataset is shown in Table 5, which also gives a general report of the collected information as a mixture of positive and negative opinion.

6 Conclusion

In order to measure teachers' opinion toward e-learning based gamification using machine learning, this study will make use of sentiment analysis on social media sites. In order to conduct the necessary interventions and corrective actions, system designers and educational policymakers are expected to benefit from having a good understanding of teachers' opinions and feelings regarding the e-learning system. Studying a student's personality is crucial because emotional intelligence and social awareness are crucial for improving academic performance and preventing behavioral problems. The capacity of learners to comprehend, communicate, and organize study-related aspects in ways that support achieving favorable developmental outcomes has been the subject of some prior studies. All types of learners, from preschoolers to college students, have been included in this research. In this study, female pre-service kindergarten teachers at Taif University were asked to rate their perceptions of the e-learning environment based on the gamification strategy as well as their level of interest in using technology to further their academic interests. It was also intended to show how these perceptions related to their interest in using technology to further their pursuits. here, discovered that there are high levels of perceptions of the e-learning environment and academic passion among the sample study, while the results suggest that there is an average level of obsessive passion. This by looking at the perceptions of female pre-service kindergarten teachers about the e-learning framework based on the gamification strategic approach. The findings also revealed a statistically significant (positive correlation) link between the sample's enthusiasm for academics and their impressions of the e-learning environment based on gamification method. The majority of the research seemed to validate these findings.

Conflicts of Interest

The author declares that he has no conflicts of interest to report regarding the present study.

Data availability

Data sharing is not applicable to this article as no data sets were generated during the current study.

Ethical approval

This article does not contain any studies with human participants performed by the author.

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