INTERNATIONAL RESEARCH JOURNAL OF HUMANITIES AND INTERDISCIPLINARY STUDIES

(Peer-reviewed, Refereed, Indexed & Open Access Journal)

An Emotional Intelligence measure using Machine Learning Techniques for Higher Education concerning UG students

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Abstract:

Several studies have looked at how students' emotions affect their class participation. The connection between Emotional Intelligence (EI) and other significant outcomes in higher education is poorly understood. The impact of children's emotional intelligence on their school performance is investigated here. Self-emotion appraisal (SEA) and use of emotion (UOE) were both significantly related to academic performance. The level of emotional intelligence a person has is a strong indicator of how well they will do in school, and this inversely correlates with the level of academic success, by developing models to comprehend college graduates, had the highest accuracy in this study's cross-paper comparison and application of diverse methodologies, at 99.8 percent. The findings of this study provide credence to previous studies which have proposed that instructors take students' EI into account when developing lesson plans.

Keywords: Emotional intelligence, Higher education, Academic performance, knowledge.

1. Introduction:

Psychological research has repeatedly shown that traditional measures of individual diversity in cognitive processing cannot account for all the variations in academic achievement. The traditional method of approaching this field has taken on a deficit orientation, with a primary emphasis on pinpointing factors that harm performance. It has been successfully summed up, for instance, that pressures both within and outside of the classroom could have a negative influence on a student's performance. Conversely, many modern theoretical frameworks are informed by positive psychology, which seeks to pinpoint the enabling effects of affective dimensions like resiliency, goal-directedness, and emotional acuity [1]. As a result of technical development, information and large amounts of data can be transmitted rapidly, hastening the spread of knowledge and the pace of

social transformation. Many nations now prioritize teaching students to study on their own accord because of the need to adapt quickly to the ever-shifting landscape of contemporary life. Self-directed learning has also been widely encouraged in the context of higher education. Self-directed learning is highly regarded in higher education because it represents the key ideals of higher education—individual autonomy, responsibility, and development—while also being relevant in satisfying the demands of society. As a result, several institutions throughout the globe define self-directed learning and related ideas like independent learning and lifelong learning as general graduate traits[2]. College students experience a wide variety of emotions, from excitement and curiosity to worry, anger, embarrassment, and boredom, all of which could have a significant impact on their motivation to study and their ability to retain information. Students who are unable to control their negative feelings throughout a learning activity are more likely to give up and stop trying. Positively emotional pupils, on the other hand, are more likely to persevere in the face of adversity because they are invested in and love their studies.Emotions could have positive or negative consequences on students' ability to learn, their motivation, and their overall performance, according to a growing body of studies. Having a good mood has been demonstrated to improve focus, determination, and productivity.Negative feelings, on the other hand, are linked to a lack of interest in and effectiveness in learning. Though negative emotions (such as worry) could have beneficial impacts by increasing extrinsic incentives to avoid failure, they can also negatively impact learners' concentration and executive function, which in turn harms their participation and learning outcomes[3].

1.1 Emotional Intelligence:

Emotional intelligence (EI) is a broad concept that includes the knowledge, skills, and abilities necessary to understand, manage, and benefit from one's emotional state.The prevailing theoretical perspectives suggest that these dispositions enable people to appropriately identify and evaluate the emotional states of others and themselves. Furthermore, EI seems to be a multi-dimensional entity defined by mutually reinforcing links between genetic, ecological, and mental components.Due to this, EI could shape how feelings are communicated, interpreted, and felt throughout a person's lifetime. Students' levels of EI are positively related to a wide range of adaptive outcomes, such as their mental health, the strength of their relationships with others, their capacity to resolve conflicts, their likelihood of completing their degree program, and how long they stay in college. EI has been connected to psychological dimensions including the desire for accomplishment, adaptive coping techniques, and good peer connections, all of which are thought to contribute directly or indirectly to student achievement[4].

1.2 Emotional Intelligence: Course, Design, and Instruction:

There is a wide range of options for including emotional intelligence in the development and delivery of educational materials and programs. Specifically, it was argued that students could benefit from having teachers who acted as role models in terms of emotional intelligence, and whose teaching methods were modeled on students' successes. To demonstrate their awareness of their students' feelings and their desire for a secure learning environment, teachers could do things like outlining procedures for handling disagreements and ensuring that students feel comfortable bringing up difficult issues in class.This is of utmost significance when broaching sensitive topics like age, gender, gender identity, and race/ethnicity. These rules aim to foster an atmosphere conducive to learning that is free from disruption by divergent opinions, encourages mutual regard among students, and safeguards the well-being of all participants. This could be a useful learning environment for students to practice the kinds of emotional awareness and comprehension that will serve them well in real-world managerial and leadership positions. The teacher could set a good example by following these standards herself, demonstrating to the students the value of civil leadership in the field of aging by encouraging open discussion of different points of view. The following are some detailed recommendations:

- Both students and teachers have a role to play in making sure the classroom is a safe and supportive place for everyone.
- One should provide everyone with the utmost decency and respect. Verbal harassment, including but not limited to, name-calling, sarcasm, and insults, is not tolerated in the classroom.
- Understanding requires both speaking out and hearing out the ideas of others. Students are urged to demonstrate a genuine interest in the ideas and experiences of their peers, even if they vary significantly from their own. The focus is on learning about one another's perspectives on an issue rather than trying to persuade others to adopt one's own.
- It's OK to have different opinions from other people and to agree to disagree with them.
- It's important to keep the conversation focused on the subject at hand rather than the people involved. So, avoid making about it throughout the conversation[5].

Figure 1 depicts the framework of Emotional Intelligence on which it is working.

Figure 1: Shows the Emotional Intelligence framework [6]

2. Literature of Review:

This strategy has been employed by a wide range of authors, who then presented their findings after doing a literature review.

Alyahyan et al., (2020)[7] study aimsto provide forth a clear road map for teachers who want to use data mining to anticipate their students' achievements.To do this, the state-of-the-art has been organized into a methodical procedure in which all the potential choices and parameters have been thoroughly examined, justified, and defended.This study will make it simpler for teachers to use data mining tools, unlocking their maximum capabilities in the classroom. Student achievement could well be greatly increased with early identification of at-risk kids and subsequent implementation of preventative interventions. These days, predictions are often made using machine learning methods. There are many examples of success stories, but only computer science or AI-competent t teachers will be able to use these strategies in the classroom.

Ahmad (2019)[8] determined existing scenario planning approaches to provide a workable model of desired and plausible probable futures in the face of persistent and fast technological change.The idea of "impact and uncertainty" served as the foundation for the development of two employment and education options for the future. This paper evaluated the preferable and probable outcomes by using aspects of the possibility space scenario architecture and a vignette approach of contemporary emerging technologies. 5G network technologies, automation, and AI will change jobs and higher education. Colleges and institutions must adjust.

Almeida (2019)[9] illustratedstudents from management and computer engineering majors were observed while they played a serious game designed to test and improve players' emotional intelligence as part of online courses. Student progress is evaluated and reviewed with a multi-pronged strategy in mind.The quantitative information was collected with the use of a tool called Master Analytics Profiler (MAP). The results show that a person's emotional intelligence is correlated with how well they do in a video game; this is true for all types of students, independent of major, age, gender, or level of expertise. Considering each group of students' unique characteristics, the research also delves into the significance of emotional intelligence. However, there are few opportunities for students to practice and improve their emotional intelligence while enrolled in higher education.

Ortega et al., (2019) [10] employ a descriptive model of leadership and EQ aspects adapted to various instructional settings.It is also demonstrated using an analytical perspective how various styles of leadership affect the various components of emotional intelligence. In this cross-sectional survey, 954 educators from 137 educational institutions took part. The MLQ-5 (Multifactor Leadership Questionnaire) and the Trait Meta Mood Scale (TMMS-24). Inventory was used to compile the data. IBM AMOS 23.0 (International Business Machines Corporation, Armonk, NY, USA) was used to conduct multi-group analysis and structural equation modeling on the collected data. The results confirmed the validity of the structural equation model. The intellectual stimulation of university professors is crucial to the practice of transformational leadership, whereas internal motivation is more important at the secondary and primary school levels.

Trigueros et al., (2019)[11] demonstrate the significance of addressing students' emotions in physical education courses, since doing so enhances the likelihood that students will achieve academic achievement and keep up healthy living practices. As such, it could be useful for physical education teachers to pay attention to pupils' feelings.The purpose of this study is to examine the relationship between teenagers' emotional well-being (their emotional intelligence and their emotional state) and their perseverance, ambition, success in school, and the adoption of healthy lifestyle behaviors. The results show that emotional intelligence is related to pleasant sentiments and negative to sad ones. In physical education, happiness indicates persistence and internal motivation. Self-motivation predicts academic and physical performance.

Phang et al., (2018)[12] determined the mechanisms at play in the connection between attachment and vacillating job interests. This was accomplished by investigating the mediation function of the equation between secure attachment and career indecision.One big Southern University enrolled 362 female undergraduates. Students ages were used as a control variable in a path model that examined (a) whether attachment has a direct relationship to the three dimensions of

career indecision (lack of readiness, lack of information, and inconsistent information), and (b) as to if emotional intelligence modulates the relations between bonding and the career indecision dimensions. A close examination of the data revealed a remarkable congruence with the hypothesized route model.The study's findings lend credence to the idea that a variety of factors, not only a lack of experience, contribute to college women's career indecision and, as a result, call for a variety of prevention programs.

Fuente et al., (2017)[13] examine the correlation between endurance, learning styles, techniques for stress management, and educational attainment under the demanding conditions of higher education. A total of 656 students at a university in the south of Spain filled out three surveys measuring their resilience, coping mechanisms, and academic routines. Data analyses included correlation and structural modeling. Using a deep learning method and problem-cantered coping mechanisms was associated with higher levels of resilience, and this prediction was supported by a positive and significant linear connection. College students' grades were favorably and strongly predicted by these factors. These findings allowed for the establishment of a linear connection of association as well as consistent and differentiated prediction between the variables under investigation.

McNulty et al., (2016) [14] determined whether there are any significant variations in trait EI scores among student radiographers in four nations based on gender, age, or culture. First-year radiography students in Australia, Hong Kong, Ireland, and the United Kingdom filled out the trait EI questionnaire short form (TEIQue-SF) to assess their trait EI.When comparing the genders, the first-year radiographic students' results on the Global EI and Sociability tests were consistent with reported norm data; however, the student's scores on the Self-Control and Emotionality tests were not. Comparison of Western and Asian cultures was shown to be a significant predictor of differences in Global EI (p = 0.022), Well-Being (p = 0.0021), and Sociability (p = 0.0031). Multiple important EI discoveries for health-related professional education are highlighted, as is the possible influence of culture on this fundamental characteristic of one's character.

Zhou and Chen (2016) [15] examined that in 1760 Hong Kong undergraduates who participated in an SDLS psychometric research. Psychometric qualities were assessed: component structure, internal consistency, criterion validity, and convergent validity. Confirmatory Factor Analysis (CFA) showed that the scale is unidimensional and that its structure is consistent across genders.The Cronbach's alpha finding also demonstrated the scale's internal consistency. Its reliability test was supported by its relationships with students' perceptions of their own social, cognitive, and personal development outcomes and their overall happiness with their college experience. By showing a connection between EQ and other emotional capacities, the research

further broadened the nomothetic scope of self-directed learning.

The provided Table 1 is a summary of the reviewed literature from different authors. Their methods and the results of their work was also described below.

Table 1: Summary of Literature Review

| Authors	Methods	Outcomes
Alyahyan et al., (2020) [7]	Machine Learning	This work will make data mining tools more accessible to teachers and maximize their classroom potential.
Ahmad (2019) [8]	Scenario Planning Approach	This study suggests how institutions might better prepare students for future careers.
Almeida (2019) [9]	Master Analytics Profiler (MAP)	The findings showed that EI's relevance in business and school needs development.
Ortega et al., (2019) [10]	Structural Equation Method	This study seeks to link teachers' emotional intelligence with leadership styles.
Trigueros et al., (2019) [11]	Structural Equation Method	This study shows that inner motivation is crucial to academic and physical achievement.
Phang et al., (2018) [12]	Emotion Path Model	The studies indicate that numerous antecedents could contribute to people's difficulties in making life decisions like career choices.
Fuente et al., (2017) [13]	Deep Learning	The various indicators of academic achievement in higher education show multidirectional and associativity.
McNulty et al., (2016) [14]	Trait (Emotional self-efficacy) Model	This study examined gender, age, and cultural differences in trait EI ratings across all categories.
Zhoc and Chen (2016) [15]	Self-Directed Learning Scale (SDLS)	This study examines the nomothetic range of self-directed learning based on emotional intelligence and emotional capacity.

3. Comparative Analysis:

Here, it shows the outcomes achieved by the Emotional Intelligence measures using Machine Learning Techniques for Higher Education concerning UG students, including Machine Learning, Scenario Planning Approach, Emotion Path model, Deep Learning, and Self-Directed Learning scale. The authors have used a wide range of machine learning and technical approaches-based

computing methodologies to evaluate the efficacy of various algorithms. The average accuracy of these algorithms is 93.7% (standard deviation). When compared among them, Scenario Planning Approach by Ahmad (2019) [8] performs the best outcomes withan accuracy measure of 99.5 % and managed good quality. The accuracy with which various writers compare the literature review in their papers is seen in Table 2 below.

Table 2: Comparison table of the accuracy of several authors

Authors	Techniques	Accuracy
Alyahyan et al., (2020) [7]	Machine Learning	93 %
Ahmad (2019) [8]	Scenario Planning Approach	99.5%
Phang et al., (2018) [12]	Emotion Path Model	92 %
Fuente et al., (2017) [13]	Deep Learning	91 %
Zhoc and Chen (2016) [15]	Self-Directed Learning Scale (SDLS)	93 %

The following graph compares the accuracy of the methods employed in this investigation to others previously proposed for use in measuring Emotional Intelligence shown in Figure 2.
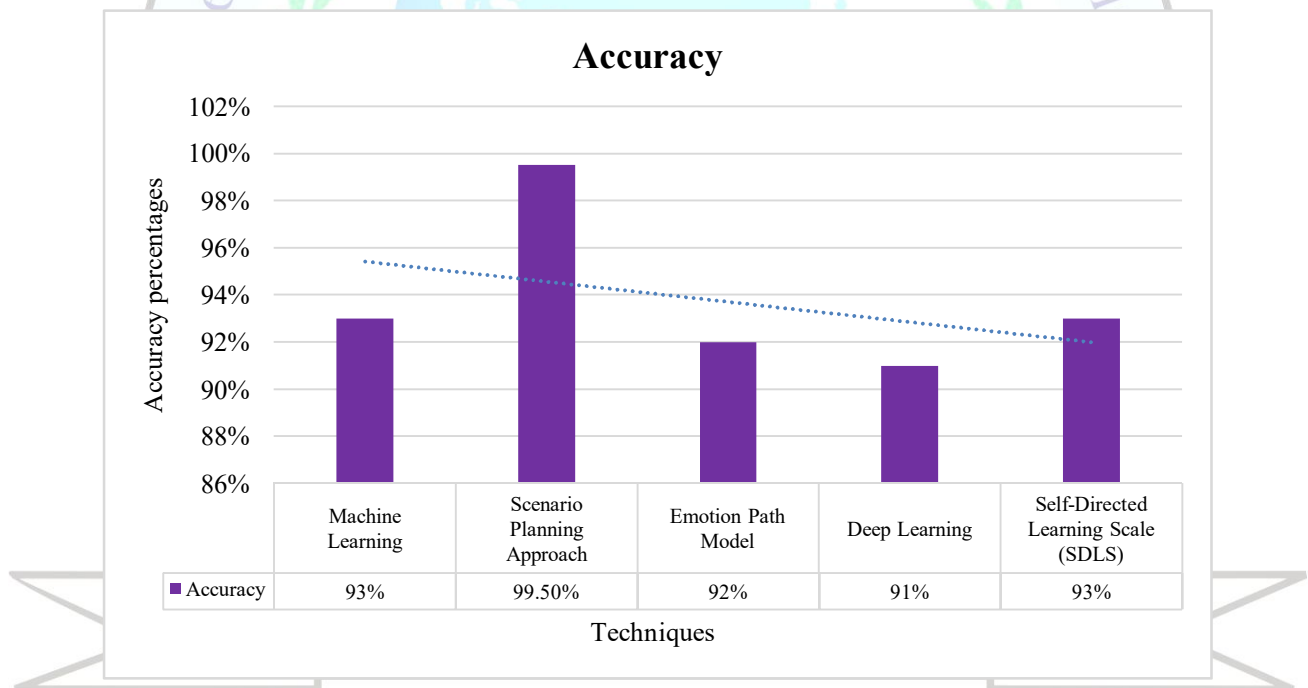
Figure 2: Accuracy Comparison Graph

4. Conclusion and future Scope:

In conclusion, this study controlled for students' early academic success in college and investigated the cumulative impact of emotional intelligence, intelligence test anxiety, and coping techniques on students' final academic performance. Academic achievement, test anxiety, and the use of emotion-focused coping strategies were all shown to be related in this study, confirming previous research. Earlier studies about emotional intelligence often used simple representations that explain

the effect of the category on learning outcomes in isolation from other possible predictors. Our research shows that general levels of emotional intelligence are insufficient to fully explain the variation in lengthy academic performance that could be attributed to students' affective and behavioral reactions to academic pressures. In this study, the comparison of various papers and their applied approaches worked and performs the best accuracy of 99.5 % by Ahmed et al (2020) [8] which worked on models to understand student success in higher education that consider the interactive influence of general social-emotional dispositions and more nuanced affective and behavioral responses on learners' capacity to manage environmental demands.

It would be fascinating for future research to compare teachers' and students' multi-rated assessments of teachers' and students' emotional maturity. So, these fields of research could contribute to a more all-encompassing knowledge of interpersonal skills as a societal, behavioral, and physiological feature within the context of higher education by combining ideas and methodologies from a variety of disciplines.

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