Emotion Analysis of Blended Learning Experience During Pandemic Using Twitter Data

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Emotion Analysis of Blended Learning Experience During Pandemic Using Twitter Data

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Abstract. The impact of Covid-19 has been felt around the world, particularly in education, resulting in generally lower standards. The transition of conventional learning from face-to-face classroom instruction to online training has been made possible by digital technologies. The study aims to discover people's feelings about blended learning through tweets. Drone Emprit Academic Public Streaming API provided an API to search for the terms blended learning. According to Twitter, 4,437 tweets were sent in September 2021 due to the proceedings. According to data collected during pre-processing, approximately 44 percent of reviews were positive compared to 46 percent of negative reviews. As a result, the number of tweets coming in from Twitter could be more evenly distributed. After an emotional survey, the researchers found joy, followed by anticipation, was the predominant emotion. While the number of negative and positive comments on Twitter was roughly equal, people's views on blended learning seemed very positive throughout the month.

Keywords: blended learning, emotion, pandemic, Twitter

INTRODUCTION

Blended learning (BL) is a decades-old educational paradigm that blends (or blends) online learning with traditional place-based (face-to-face) instructional techniques[1]. Although students are still required to attend physical schools with a teacher present, face-to-face classroom practices are combined with computer-based content and mediation activities to enhance the teaching-learning experience and inspire students to engage more with the subject at hand. Since the COVID-19 epidemic, individuals have had to do many more things in their free time, including learning new things. There are no norms or laws governing the learning process when students study from home[2].

During a crisis following the Covid-19 epidemic, an increased interest in the function and usability of online and digital learning was noticed[2][3]. According to various studies on cooperative and transformative learning (TL), new and better learning methods can be visualized by implementing accessible, flexible, and affordable technologies in education. As well as through the integration of offline and online activities while setting clear learning goals and assessing how well students are achieving these goals[4].

Amid this Covid-19 outbreak, the government is shifting control of educational processes to online or technology-based learning. The impact of Covid-19 has been seen worldwide, particularly in education, where it has lowered standards across the board. Digital technology has transferred traditional learning from face-to-face classroom instruction to online instruction. Technology-based learning in the new standard era can provide efficient and innovative service[5]. Students from high school through college use online platforms to make learning more authentic. These platforms offer multiple features in terms of live or streaming learning or forming small discussion groups. Here, blended learning is a method that combines the use of technology with traditional teaching methods, such as small group discussions and interactive learning materials delivered over the Internet[6].

According to the results of one study in Korea, online blended learning can make up for the drawbacks of online lectures while also improving lecture quality and student happiness. In the future, new blended online teaching techniques can be developed based on new concepts, with the use of blended online learning complemented by the peculiarities of each class. Another study conducted in Indonesia revealed that blended learning applications significantly impacted students' productivity in the classroom[7]. Figure 1 shows the number of students (billions) affected by school closures due to Covid-19 in March 2020

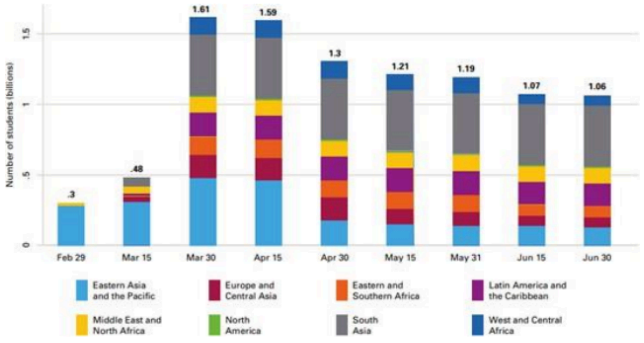

FIGURE 1. Number of Students (Billions) Affected By COVID-19 School Closures by Date and Region[8]

The pedagogical value of blended learning methods in self-study is discussed. Teachers face several challenges when attempting blended learning projects as they need to adapt to the classroom and acquire technological skills while also changing their pedagogical responsibilities[9]. The study aims to use their tweets to find out how people think about blended learning. To illustrate the importance of blended learning, the results of this research will use Twitter user reviews.

Researchers conducted a similar study on learning online sentiment analysis using Twitter keywords. This research used the term "blended learning" and collected the required data in September 2021 with the help of Drone Emprit Academic[10], [11]. Naive Bayes classification is used to process the analysis results, allowing sentiment and emotion analysis using Twitter data and Plutchik's wheel model[12]–[15]. According to the results, blended learning can be evaluated for its long-term suitability as a teaching method through an emotional implementation analysis[16].

METHODS

Blended Learning

Blended learning is a mixture of teaching methods, lesson designs, and delivery methods. Because it contains both traditional and cutting-edge components, students get the best of both world[17]s. Many different categories have been used over the years to describe similar educational environments with only minor semantic variations. Although blended learning is a relatively new categorization system, the wide range of names and semantic variations used to describe it leads to confusion and misrepresentations[18].

The most effective approach to integrating online and face-to-face learning while simultaneously addressing the drawbacks of each is via blended learning. Students learn both face-to-face and online using multimedia on

computers, smartphones, and other technological devices. Despite the distance, teachers and students may still interact. Through face-to-face meetings, students may identify and correct faults in online learning materials, as well as overcome other obstacles to student retention throughout the learning process[19].

The most effective approach to integrating online and face-to-face learning while addressing the disadvantages of each is blended learning. Students learn face-to-face and online using multimedia on computers, smartphones, and other technological devices[20], [21]. Despite the distance, teachers and students can still interact. Through face-to-face meetings, students can identify and correct errors in online learning materials and overcome other barriers to student retention throughout the learning process.

Twitter Sentiment Analysis

Tweets or short text messages are the primary means of communication on Twitter, a rapidly growing online platform. Twitter can hamper the agenda-shaping abilities of traditional media, as journalists rely on tweets to get news and opinion. These tweets are scientifically examined for their semantic meaning using sentiment analysis. It is possible to use sentiment analysis to tell if a text is positive or negative by categorizing it according to its polarity and then through an identification and categorization process.

The data pre-processing in the form of a word bag, sentiment evaluation, data categorization, evaluation of a classifier model, and selection of the optimal sentiment analysis model are shown in Figure 2. The Drone Emprit Academic (DEA) dataset is used for all operations performed using the Rapid Miner software[22]. DEA streaming, a free application programming interface (API), was used to search Twitter for data on blended learning experiences[23]. Keywords such as blended learning and hybrid learning were used in the search. Around 4200 tweets were generated with the term blend learning. All evaluations are checked for spelling mistakes and emoticons before they are used, which could falsify the results. Only if the opinions and experiences of the users influence the selection criteria are they taken into account. It is essential to remove any unclear or unnecessary information from the sentences to ensure that the sentiment analysis is as accurate as possible. Review text, hashtags, scripts, and ads using retweets, emoticons, and hyperlinks[24].

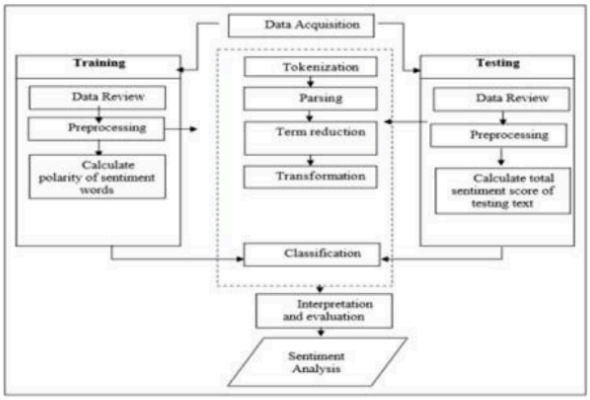

FIGURE 2. Research Method[25]

Emotional Analysis of Plutchik's Wheel

Plutchik's wheel model summarizes the emotional analysis of text categorization results. Robert Plutchik was the first to propose this theory, which identified four opposing emotional states as the basis for his emotional circle. These states include joy and sadness, anger, fear, and confidence in one's ability to keep promises, but disappointment, surprise, and anticipation. These eight feelings are considered complete, interconnected, and yet distinct. Using a color wheel, Plutchik demonstrated the connection between the concept of emotional circles. For example, serenity is a level of arousal less powerful than ecstasy. Primary emotions are shown in different intensities[26].

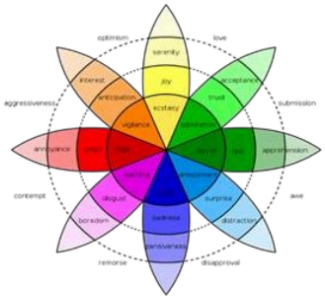

FIGURE 3. Plutchik Emotional Circle[27]

Each language is assigned a specific weight for text categorization, resulting in emotional extraction. When moving outwards, the round shank carries the most weight, e.g., B. Sorrow (deep sadness) associated with the 4. The movement out of the center reduces the weight of the emotions in the second layer, which weighs the 3. The following equations can be used to estimate how many different emotions appear in a text as a whole (1):

$$Emotion\ count\ C_i = \sum_{j=1}^{n} Occurence\ of\ Emotion_{ij} \quad (1)$$

Then in equation (2), the intensity of IE_i of each emotion in the text is obtained from the results of multiplication with the weight of W_i emotions:

$$Intensity\ of\ Emotion\ IE_i = C_i\ x\ W_i \quad (2)$$

The intensity of the emotion is then added to the $W_{iprimeemo's}$ emotional bulk, allowing the weight of all primary emotions to be updated through the mechanism shown in Equation (3):

$$Weight\ of\ Primary\ Emotion\ W_{iprimemo\ updated} = W_{iprimemo} + IE_i \quad (3)$$

RESULTS AND DISCUSSION

The public streaming API of DEAs was used to search for the keywords blended learning. In September 2021, 4437 tweets were produced due to the process. Table 1 shows some of the tweets collected during the research. Table 1 shows four examples of successfully crawled tweets.

TABLE 1. Sample Crawling Data Using the Keywords 'Blended Learning'

Username	Tweet
@GalwayLabour	*Second, our educators need to show the same urgency and empathy in addressing this crisis as we did in responding to the COVID pandemic: well-designed blended learning has the potential to expand access and enable students to learn at their own pace*
@suaramuda98	*Then the method used is blended learning or mixed learning with a combination of face-to-face and distance learning. The curriculum used is an essential learning material selected through the school cluster. Vaccines and processes are important*
@vhill01	*Many schools, teachers and districts are too quick to rule out #onlinelearning #blendedlearning because of expectation bias. Need to take an open-minded approach in this*
@MarkCamilleri	*There are still a number of challenging issues and implications for the successful transition from traditional and blended learning approaches to fully virtual and remote course delivery*

The polarity of the opinions was determined using a mood dictionary. After pre-processing the review dataset, it was found that approximately 44 percent of the reviews were positive, while 46 percent were unfavorable. As a result, there is an uneven ratio of tweets coming from Twitter. Student response has been overwhelmingly positive, with students stating that they prefer blended learning because it allows them more control over their schedules,

improves classroom convenience, and saves money. In addition, the vast majority of positive reviews believe that blended learning is more beneficial for students.

While all this is happening, most negative criticism places the blame squarely on educational institutions. Using blended learning materials instead of traditional classroom teaching techniques can be challenging for some teachers due to time constraints. Students must learn how well they will use the time they allocate to online learning activities.

TABLE 2. Sentiment Test Data Analysis

Sentiment	Emotion	Confident (Positive)	Confident (Negative)	Text
Positive	joy	0.9426	0.0065	Second, our educators need to show the same urgency and empathy in addressing this crisis as we did in responding to the COVID pandemic: well-designed blended learning has the potential to expand access and enable students to learn at their own pace
Positive	Joy	0.9811	0.0045	Then the method used is blended learning or mixed learning with a combination of face-to-face and distance learning. The curriculum used is an essential learning material selected through the school cluster. Vaccines and processes are important
Positive	anticipation	0.8790	0.0065	Many schools, teachers and districts are too quick to rule out #onlinelearning #blendedlearning because of expectation bias. Need to take an open-minded approach in this
Negative	fear	0.0089	0.9577	There are still a number of challenging issues and implications for the successful transition from traditional and blended learning approaches to fully virtual and remote course delivery

Figure 3 below shows that negative and positive emotions related to blended learning on Twitter in September 2021 do not differ significantly compared to last year.

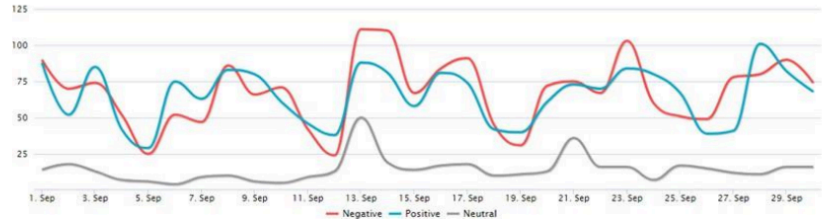

FIGURE 3. Sentiment's Trends in September 2021

The results of the emotion study showed that joy was the dominant emotion, followed by anticipation. Even though negative and positive reactions on Twitter were almost equal, people's attitudes toward blended learning seemed very receptive throughout the month.

FIGURE 4. Emotion Analysis Results

CONCLUSIONS

Twit blended learning was used in this study conducted in September 2021 to conduct sentiment analysis of the data. According to the research, 44 percent of the participants were positive, and 46 percent were negative during this period. Other students, lecturers, and organizers, after their excellent experience, will be more inclined to adopt blended learning techniques in the future because of their positive experiences. The results indicate that blended learning should continue to be an integral part of the educational process. According to an Emotional Happiness Analysis conducted this month, blended learning has received a positive reception from Twitter users on social media platforms. In the future, expanding the amount and variety of data sources used in blended learning research, such as Facebook, to help improve the sentiment analysis of blended learning research. It is also possible to broaden the scope of the study of blended learning perceptions by including other components or characteristics such as gender, age, and location to learn more about the key variables affecting blended learning experience and satisfaction influence.

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