

Communication Theories Applied in Mentimeter to Improve Educational Communication and Teaching Effectiveness

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Abstract—This work aims to find out some communication theories applied in Mentimeter, a latest website to create questions and collect answers, to improve educational communication and teaching effectiveness. Six communication theories, which are Selective Attention, Hot Media Theory, the Spiral of Silence, Face Theory, the Role of Repetition in Learning and Schramm's Model of Communication, will be firstly discussed in theory and secondly analyzed in two real cases. The purpose of the study is to figure out the specific communication theories that make the Mentimeter a good tool to assist teachers to improve teaching effectiveness and enhance educational communication skills, and provides some insights for the future development of educational digital tools.

Keywords: *Mentimeter, educational communication, teaching effectiveness*

I. INTRODUCTION

Nowadays, technology is developing rapidly. Various technologies are used in different fields. Those technologies have changed our life greatly. It is the same in the education area. The Internet provides educators a new medium to deliver teaching – one which can bring new and exciting ways of learning, and an alternative to traditional teaching techniques [1]. Since recalling prior knowledge is an essential process of a class, the Internet-based website Mentimeter uses its brand-new way to replace the traditional way of recapping and makes this must-existing procedure becomes more effective and filled with fun.

The paper is composed of four main parts: theoretical background, methodology, discussion, and conclusion. In the theoretical part, the definition and explanation of the used communication theories will be given out. What's more, the introduction of the Mentimeter will be discussed. After that, two authentic cases will be analyzed, in which different communication theories will be applied. From the results of the two cases, an overall discussion about the communication theories applied in Mentimeter and their influence on educational communication and teaching effectiveness will be presented. In the end, a conclusion about the educational communication methods showed in Mentimeter and the teaching effectiveness by using those

methods will be summarized, providing a detailed reference to the design of future Internet-based educational devices or websites.

II. THEORETICAL BACKGROUND

A. Selective attention

Selective attention is the process of paying attention to just a few stimuli, which we think are relevant or important to us and filter others. People's capabilities to process information are limited, which means we can just process a limited number of messages at a certain time. Therefore, we have to decide which stimulus is more attractive based on our own hobbies, surroundings, past experience and so on. After finishing this selecting process, we can be more attention focusing.

B. Hot media

According to Center [2], "Hot media are characterized by having high resolution. Hot or high resolution means that the information contained in the media is complete and explicit". When people are processing information, extra thinking, imagination or speculation is needless. Everything is given. Like television, movies, videos and photos are hot media.

C. The spiral of silence

The spiral of silence theory based on an assumption that when individuals are exposed to media information for a long time, they will naturally acquire a quasi-statistical faculty, that is, the ability to perceive the social environment, to detect the mainstream opinions presented by the media. Also, it mentions that people have an inherent fear of being isolated. When people find their views agree with public opinion, he will become more confident and express themselves without worrying about being isolated. However, when people find their opinion is the minority, they will become uncertain and doubt their judgment. What's more, "voicing the opposite opinion, or acting in public accordingly, incurs the danger of isolation" [3]. Therefore, they will tend to keep silent. Based on this "spiral" of silence, public

opinion will always be those opinions which held by most public so that minority opinion will never be heard.

D. Face theory

According to Goffman [4], face is a public image that every member of society intends to earn for himself. Individuals are concerned about how people think of themselves. People try their best to maintain the social image they create for themselves when they are interacting with others. If the social image is diminished, it means people have lost faces. And people tend to do their best to avoid that happening.

E. The role of repetition in learning

Aristotle once talked about the importance of repetition in education by saying "It is frequent repetition that produces a natural tendency". Repetition can help students require new skills and let those skills become their second-nature. In Dahlin and Watkins' research [5], they also drew the conclusion that repetition can not only "help memorizing knowledge by creating a deep impression" but also help understanding. Therefore, repetition plays an important part in learning since it can transform a skill or knowledge from the conscious to the subconscious and let them become easier and easier for students.

F. Schramm's model of communication

Wilber Schramm came up with the model of communication in 1954. Compared with the Shannon Weaver Model, he emphasized more on the importance of interaction between the sender and the recipient. The sender encodes his thoughts into content and sends to the recipient. The recipient achieves the information and tries to understand the meaning the speaker intends to convey which is called decode information. Then the recipient must give feedback to the sender to show how he understands the message. Therefore, the sender can explain more about his thoughts if the recipient can't get the right meaning. The full circle is incomplete unless the sender receives the feedback from the recipient. And encoding and decoding are the two essential parts in effective communication. And the communication can become more accurate because the sender can give more explanation based on the recipient's understanding level.

G. Mentimeter

Mentimeter is a kind of website or app used to create live presentations, with which the presenter and the audience can communicate with each other immediately through the platform. It allows people to express themselves at the same time without worrying about interrupting other people and their own "silly" responses.

It was invented by a Swedish company. And it was used to hold company meetings for the very first time. However, because of its promptness, Mentimeter is used by school teachers widely during these years. Many teachers use it as a tool to do a quiz or show teaching materials. It turns out to be

very useful and helpful for it enhances teaching effectiveness greatly and engages students quite well.

III. METHODOLOGY

This section aims to reach the main purpose of the study in the process of comparing and analyzing two cases. After that, the results of the two cases will be discussed and the communication theories will be applied in the two specific cases.

A. Case study

Two observations were carried out in two different classes. Since the Mentimeter is usually used in at beginning of the class as a recap, the observations lasted for about ten minutes from the beginning of the class. The observations were done at the same university in China with the same number of students, which was 30, in each class. The two classes both were teaching knowledge about English Education. The same teacher taught two different classes separately by using different recapping method. In one class, the teacher applied a traditional quiz as a recap, while the Mentimeter was used in the other class.

1) Case one: In the first class, the teacher went into the classroom with a list of questions prepared before. After settling down the students, she told the class that they were going to review the last day's lesson and they were required to answer her questions. All the class became extremely silent at that moment and most of the students looked serious.

"The first question is what is Bloom Taxonomy?", the teacher asked her first question and waited for the answer. Ten seconds passed, all the class was silent. "Anyone?", the teacher tried again. Still, no student wanted to say a word. "Ok, Judy, can you answer the question?", the teacher picked up one student and wanted her to answer the question directly. The girl stood up slowly and hesitantly. She spoke out several words and finished her answer briefly. The teacher then asked another student to make a supplement. After several rounds of ask-and-answer, the teacher asked if anyone has more questions, the class still kept silent. Then the teacher turned to the next questions. During the whole process of reviewing the knowledge, the class was so nervous that they even feel scared and unwilling to answer the questions. The phenomenon was heavy and serious. After this class, we asked some questions that the teacher has recapped at the beginning of the class. And we found students still cannot grasp the knowledge firmly.

2) Case two: In the second class, the teacher used Mentimeter as a prop to help her do the recap. After she settling down the students, she asked them to take out their smartphones or computers. All the students were curious about the instructions. They quickly took out their devices and waited for the next instruction. "All right, now please login into menti.com. And use this class code to enter our classroom", the teacher gave out clear and short instruction. All the students could manage their devices and get into the

correct classroom within two minutes. "Ok, I guess all of you are already in the classroom. Now, we are going to do a recap", the teacher clicked the mouse and the first question popped up on the screen. The same question turned out on the students' screens as well. "Now, you have thirty seconds to choose the right answer. Please vote without hesitation!" All the students stared at their screens and tried their best to choose the answer. The countdown clock was so eye-catching that everyone was highly focused on the question. The first question was a multiple-choice question. When the time was up, the teacher clicked the mouse. The answer turned out at once. "Oh, the correct answer must be B. It has a different color." One student shouted out excitedly. On the screen, the number of people choosing each option is shown in a bar chart. Students began to analyze the results. "Item A gets the most votes." "The correct answer was chosen by the least people!" A little laughter burst out. "Ok, we can see that most of you are not good at this small knowledge point", the teacher gave out some feedback and explained the knowledge to students in detail.

The next question popped out. This time was a short-answer question. Students were required to answer the question in less than five words. All the students focused on their screens again and typed the answer quickly. It was the time to show the answer. The teacher clicked the mouse and a word cloud turned out. All the answers were collected in a word cloud and the words or phrases which were most frequently mentioned by students were shown in the center of the word cloud with the biggest format. "Can you see those biggest words? I can ascertain that they are the correct answer for this short question", the teacher repeated the answers and made a short comment on students' performance. Then, the third question popped out. Ten questions were included in the recast and showed in different forms. Some of them were multiple-choice questions, some were short answer questions and some are videos. Each time when the new question popped up, all students were excited and longed to see the question and clicked the answer. The Mentimeter is just like a level-based game, inspiring students to keep on thinking and learning. After all the questions were answered, the teacher showed a new "question page" to students and invited them to type down their own puzzles or questions. About twenty questions popped up on the screen. The teacher talked about those questions one by one, accompanied by the discussion between students. All the problems were solved in the end. Almost all important knowledge points were reviewed comprehensively in these ten questions. The teacher went on teaching the new lesson. After class, we asked the same questions asked in case one. Apparently, students have solved most doubts and even learn more things after discussion.

B. Results

The main objectives of the results are to apply the six communication theories in the two cases and figure out their effectiveness in teaching.

1) *Selective attention*: According to the selective attention theory, individuals will select the most important thing or the thing which attracts them most then put all the energy on it.

In case one, the traditional form of recapping part was used. The long list of questions, teacher's oral questions, ask-and-answer format, roll call to ask questions and so on. All these methods and forms have been used thousands of times in class. Nothing interesting could be found by students and the only thing they felt was the stress of being asked and the embarrassing feeling if they answer the question wrongly. Therefore, they wouldn't choose to focus on the questions at first since most of them felt it was boring and took it as a formality. Instead, they tended to choose to focus on stress and fear. They spent their energy on thinking whether they would be asked or not or how to pretend to know the answer if they were asked. What they really focused on was not the answer to the questions. Hence, the real purpose of the recapping part couldn't be achieved.

However, in case two, students were asked to use their own smartphones or computers to login in Mentimeter. This was the time when they were required to use technology. "Technology integration has the potential to increase student motivation" [6]. As we know, digital devices are great attractions for young people. Students will feel confident in completing the recap quiz due to their familiarity with the technology. The interest of the students was immediately aroused. They selected to focus on the new and exciting way to do the recap. Their schemas were also activated at the same time, which helped students to recall the learned knowledge in their brains and performed better during the recap process. What's more, the login-in process, the various types of questions, the way to answer the questions, the countdown clock, and even the way to show the answer were totally new to the students. They felt curious and chose to focus on the recapping process. Every pop-out was new, students could be motivated again and again. Their attention always paid on the new interesting things popped out on the screen. They wouldn't feel bored even the knowledge has been taught in the last class since they were being asked in various forms.

Therefore, in the beginning, teachers could catch students' eyes more quickly which could enhance class efficiency. Then students could keep focusing on the questions and thinking hard to answer the questions in the time period, which could also improve the effectiveness of the class. The motivation kept high.

2) *Hot media*: When we talk about the hot media, videos, audios and clear images are included. The similarities of them are that they both contain a great number of information which is shown clearly and directly. People can just receive the messages and then understand them. No more thinking, imagination and speculation.

Doing a recap is necessary in a class. It can remind students of what was done in the last class to maintain the flow of the concept as well as to refresh students of the previous concept [7]. All the concepts should be concise,

accurate and direct, giving deeper impressions on students' minds.

Mentimeter is a kind of aggregation of hot media since the forms used to show the core knowledge include short videos, audios, and graphs. It is used as a recapping tool by teachers. During the quiz, the teacher used several short videos to help students recap the knowledge. Normally, a question would follow and students needed to answer it. During the process, we found that almost all the students can get what the teacher wanted them to remember and the meaning of the questions. However, in case one, students asked the teacher what her question meant more than once. We can see that the clearness and directness of hot media play an important part in teaching and learning. In case two, when students were watching those videos or hearing short audios, the core knowledge was conveyed animatedly and completely. Those messages were so explicit that students could just receive and remember them which help them recap the core knowledge more efficiently. What's more, they didn't need to process that information by themselves which might cause some misunderstandings and diminished the effectiveness of the recapping part. The main purpose of the recapping part is to consolidate the old knowledge and the thinking process for students should be finished in the teaching part. By using Mentimeter and those hot media, teachers conveyed knowledge explicitly and students could receive them more easily. Therefore, educational communication becomes clearer and the effectiveness of teaching goes up.

3) *The spiral of silence*: The spiral of silence theory talks mostly about public opinion. It shows that individuals who hold minority opinions tend to keep silent since they are afraid of being isolated by the public.

This theory can also be applied in the classroom setting. In case one, when the teacher asked volunteers to answer the question, no student applied automatically. Judy, the girl who was asked to answer the question, just did it quickly and briefly. In these two situations, students were not willing to express themselves since they were not sure whether their answers were correct, in other words, whether they were a "public opinion" and most classmates would agree with them. They were afraid of being "isolated", being the special one that others might think they were weird. We also found that when teachers asked "does anyone have more questions", even most students still couldn't get the core knowledge actually, no one replied. This is also because of the uncertainty about whether their questions were minority or queer. And keeping silent was the best way to avoid being "isolated".

However, in case two, those situations were avoided by using an anonymous way. Students could see their results while others could just see the whole results of the class but didn't know who chose each answer. Then they could make hot discussions based on the results. Real learning occurs when students engage with one another conversationally about the similarities and differences revealed by the shared display [8]. Similarly, in the asking-questions part, students typed their questions on their phones so that the teacher

could see them on the screen while did not know who raised the questions. Therefore, while solving the problems, the communication between teachers and students also be improved. "The anonymity of the classroom network enabled those students who are shy or less confident to more fully participate" [9]. Students were more willing to speak out their thoughts since there is no risk of being "isolated". They answered the questions more freely which could show their real thinking and understandings. The teacher could recap the core knowledge according to the student's performance which was beneficial to the effectiveness of teaching. It was also easier for teachers to provide students formative feedback, which could implicate future teaching and learning. What's more, students' questions could be solved timely, which was also an efficient teaching and learning pattern. All these benefits owe to the anonymous way which avoids "the spiral of silence" and eliminates the barriers in communication between teachers and students as well as among the class.

4) *Face theory*: Face theory shows that individuals manage their social images and if their social images are diminished, they lose face. While no one wants to lose face, so they tend to those behaviors that can protect them from losing face.

A factor that also contributed to the situation we have talked about in the last point in case one was those students who cared about their faces. If they answered the question wrongly or asked a stupid question, they might be laughed at by others. Most students were likely to take it as losing faces. They would feel embarrassed and uncomfortable. And the only way to avoid losing faces was to keep silent and did not ask any questions. However, this impeded communication between teachers and students. Teachers couldn't carry out the lesson smoothly which was time-consuming and low effective. She just kept asking "anyone else?" and no one answered. Also, students couldn't solve their problems which did harm to their study in the long run. What's more, the atmosphere in class was tense and unbearable, forcing students to keep a distance from their teachers and the class. Lacking the relatedness with teachers, students became less motivated and easy to off tasks.

In contrast, students in case two did not need to care about losing face since all the answers were anonymous. They shared their bold and fancy ideas which could stimulate inspiration and hot discussion. At the same time, they solved their problems with teachers. The teacher-student interaction was improved and the real progress could be made under this open and nonjudgmental environment.

5) *The role of repetition in learning*: Repetition has magic power in communication. When information is being repeated enough times, people tend to accept it and think it is true. Because repetition has transformed the message from conscious to subconscious. Similarly, if knowledge or skills are repeated frequently, they can sink deep into people's minds and become their second-nature.

By using Mentimeter, the core knowledge in the last class could be asked in different kinds of questions again and

again. Students used the knowledge to solve various questions which helped them review the knowledge repeatedly. The impression of the knowledge was strengthened. Therefore, after the recapping part, most of them could grasp the knowledge firmly. The purpose of enhancing the core knowledge of the recapping part could be reached.

6) *Schramm's model of communication*: Schramm's model of communication emphasizes on the encoding and decoding of the message, especially the decoding part. Only the recipient decodes the message and sends the feedback to the sender and the sender makes extra explain to improve the conversation if the conveyed meanings can't be understood by the recipient, the whole circle of communication can be complete.

Applying this theory into the education setting, in the complete communication circle between teachers and students, teachers encode knowledge and send them to students, then students receive the message and decode them based on their basic knowledge and comprehension ability. After that, the students should give feedback to the teacher to show their understandings. In the end, teachers also give feedback to students and help them understand the knowledge better. None of these parts should be left out. This back and forth is also a form of scaffolding. The teacher uses feedback to scaffold students and remove the scaffolds in the end, which stands for students' final understanding of the knowledge.

In case one, the circulation of communication was incomplete. The teacher sent out the knowledge and the students received them. But they did not give any feedback to the teachers so that the teacher could not give further instruction to them and scaffolded their learning. Apparently, the teacher had tried to get feedback from students, while this kind of passive pattern did not work well. And the incomplete communication circle caused the weak grasp of knowledge of the students. However, in case two, the last step in the recapping part was students asking questions through Mentimeter and then the teacher explained those questions one by one and students could also discuss with others. These factors made up a complete circle and improved the teaching effect. The teacher led a discussion between students and herself. During the process of solving problems, every student joined in and tried their best to follow the teacher's guidance. With the scaffolding from the teacher, such as some questions, the students got to decode the conveyed knowledge correctly. "Scaffolding is not only teacher support but assistance that is designed to help learners to work with increasing independence" [10]. The students solved their own problems independently in the end when the scaffolds were moved away.

IV. DISCUSSION

From the results of the two cases, it is possible to find out some specific communication theories and skills that can be used in developing educational digital tools in the future. The Mentimeter is an update educational digital tool that

improves the process of recapping so well. The advantages those technology-based tools can bring to educational communication and teaching effectiveness will be concluded below as well.

For the future educational digital tools, the first thing they should consider during the designing process is how to engage students' attention efficiently. Students usually start a new class aimlessly. They may just finish a PE class or just come back to the class. It is hard for them to focus on the class at once. Therefore, it is important for digital tools to attract students' attention and save time for teachers. The Internet and smartphones should be fully used because they are the most familiar and attractive things to students. What's more, students' proficiency in using the Internet and smartphones shortens their time of managing the tools. It also implicates that the management of educational digital tools should be easy to control.

Second, the forms of presenting a quiz or learning materials or something like that should be various and novel. Hot media like videos and pictures should be included. The patterns of showing answers should be diversified. Therefore, the design of educational digital tools need to have platforms enabling all kinds of patterns can be used or inserted. The different patterns keep students fresh all the time so that they can emerge into the knowledge totally.

Third, the educational digital tools should maximize students' participation rate. The knack to achieve the goal is to create an open and welcoming platform which means to protect students' faces and privacy. The anonymity is an excellent way to reach the goal. When the students use avatars instead of their real names to login into the system, they feel free to talk about their understandings and express their doubts. They do not need to care about the consequences of making things wrong. The class atmosphere will become more relaxing. The interaction between students and teachers will be aroused automatically.

Last, for the benefits those educational digital tools can bring to educational communication and teaching effectiveness, they are mostly shown during the interaction process. Because of the automatic answer-collecting function, all the answers are collected in a short period. Teachers do not need to waste time to collect answer sheets or pick up students during the class. They can talk about the answers shown on the screen immediately and give feedback to the whole class. During the process of discussion, teachers grasp the chance to scaffold students. They can use questions and explanations to guide students step by step. With this kind of scaffolding and discussing, students can solve their problems efficiently and independently in the end.

V. LIMITATION

Though Mentimeter can help improve educational communication and teaching effectiveness to some extent, it still has some limitations which may diminish its effectiveness.

Before talking about the main limitation, I want to explain the "noise" in the Shannon Weaver Model. "Noise is the physical disturbances like environment, people, etc. which does not let the message get to the receiver as what is sent" [11]. When using Mentimeter, several "noise" may pop up. For example, some students don't have their digital devices or they can't get access to wifi or network. The low network speed can also reduce efficiency. These are all technological "noise". Students are very likely to be interrupted by other information in their digital devices which may distract them. "Noise" like these can harm the effectiveness of Mentimeter.

Since the whole process is anonymous, it's hard for teachers to identify the participants and non-participants. Though most students tend to take part in the recapping part actively, there is still a small group of students who didn't want to join in it even the process is interesting and fresh. If teachers just let them behave like that, their grades will go down which violates the purpose of teaching. Also, some students may be free-riders. They don't want to contribute their answers and just wait for others' answers. This is also harmful for the developing of those students.

These limitations should be considered when designing the educational digital tools in the future.

VI. CONCLUSION

The outcomes of the study show the application of communication theories in Mentimeter and also the importance of developing educational digital tools to enhance educational communication and teaching efficiency. The Selective Attention Theory indicates the wonderful attracting effect of using the Internet and smartphones. Hot Media Theory, the Spiral of Silence and Face Theory all bring us some advice on how to design educational digital tools with various patterns and anonymous functions in order to activate students' participation. For teachers, they should make good use of the great functions of those tools. Teachers will gain more opportunities to have deeper and efficient interactions with students. When teachers figure out the shortages of students, they can both help students solve problems through scaffolding and make implications for their teaching methods and contents. However, there are still some limitations of these educational digital tools that need to be taken seriously and improvements should be made in the future.

To finish with, the communication between teachers and students is vital in the learning process. In order to better command the process, different communication theories should be applied in inventing educational digital tools. By doing that, educational communication and teaching efficiency can be improved.

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