Minutu: Leave Fine-Grained Feedback with emojis for better learning.

Noé Domínguez Porras
KAIST
poguez@kaist.ac.kr

Yekaterina Abileva
KAIST
k.abileva@gmail.com

Yergozhin Nurzhan
KAIST
nurzhan.yergozhin@gmail.com

ABSTRACT

Leaving a proper feedback for a lecture or some educational material is a vital step in the educational process, usually this activity controls the quality of knowledge a student achieves. Universities usually use their own evaluation systems to improve courses, they are done at the midterm and final of the semester. However, the information is separate from Q&A systems which are rarely used for continuous learning of the students. We approach the education feedback in a more granular and continuous way. By using the One-minute paper technique combined with emoji enriched feedback we implement a fast technique for creating granular feedback with anchored comments by students who attend in-person lectures. Later we make a study in on-online a posteriori learning by people who use presentations for learning purposes online.

Keywords

Crowdsourcing, User Interface, Learnersourcing

ACM Classification Keywords

• **Human-centered computing**

• *Human-centered computing~Collaborative and social computing •Applied computing~Education •Applied computing~Interactive learning environments*
• *Applied computing~Collaborative learning*

INTRODUCTION

Well-developed feedback system is a crucial step in delivering the information from a professor to a student. While almost every university has its own Q&A and course evaluation systems, it is rarely used by professors for redesigning their way of delivering the information during the semester. In addition, the existing systems usually lack topic granularity and are hard to interpret for analyzing student feedback.

Minutu enables learners to leave the feedbacks and answers on particular topics, uploading the confusing slides or pictures, and linking their feedbacks with one of the three emojis: confusing, valuable, curious. Linking feedback with the emoji provides students with the ability to better express their feelings about the topics, and also allows the professors to analyze the feedbacks more efficiently, because the feedbacks are later sorted and summarized according to the emoji emotions.

In our project, we decided to focus on the research at the first place, so we conducted two studies, offline and online. The main focus of both of these studies was the relation between the quality and effectiveness of the feedback and the emoji emotion to which it is linked. In general, both studies, which involved more than 120 participants combined, confirmed that the students feel that their feedback carry more information and provide their feeling about the topic more effectively if linked with an emoji.

BACKGROUND AND RELATED WORK

One-Minute[1] paper technique was developed on 1996 and since its development it has been positioned as modest, relatively simple, low-tech innovation[2] for in-class feedback. The technique helps to develop a closer channel of communication between teacher and student. Moreover, the technique creates rapport with a large class of students[1] that can lead to increased attention in-class, facilitates motivation for learning and increases student receptivity to what is being taught.[3]

There are other systems that make an instantiation of Muddy Cards or One-minute papers in Applied Computing Education like Mudslide[4], which provides timely feedback in MOOC which is a context where real-time feedback is absent.

Other of the insights for creating a more effective learning process is that there are different affective states which can alter the learning experience of people. Confusion as reported by D'Mello et al[6] can be a state that can be beneficial for passive students who are bored to create motivation in challenging situations for deep-learning. Other states valuable for the learning process that have been reported among studies are the Engaged concentration/Flow[7,8], confusion[9], frustration[9] and boredom[7,9].

Other important factor of study in computer-mediated communications is the de-individualization[11] which is a cognitive state produced by visual anonymity and physical isolation. When interactions via computer are prolonged in time, one meets a level of intimacy higher than that of face-to-face communication and the phenomenon of "hyperpersonal communication"[12]. Producing propensity to emphasise the positive or socially desirable characteristics of the people with whom one interacts. Producing central route for easier discussion than face to face discussion[12].

SYSTEM

Some questions that we wanted to explore in our research are:

- Are emojis connected to people's emotion?
- Do people think an emoji can enrich questions with their feelings?
- Do people prefer to do questions in anonymity?

During the first iteration of our project we chose some emojis that represented confusion, valuable information and curiosity for the students to keep learning and bring them to an engaged state for proactive creation of class materials by the professor.

For that task we conducted a survey among 26 Students(most of them Kazakh citizens) to get an insight about which emojis we could choose to represent the emotions. We selected the emojis depicted in Figure1.

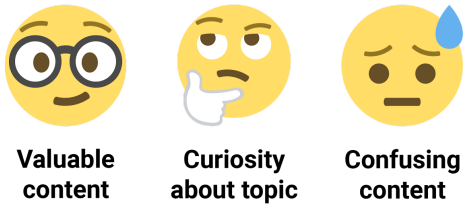


Figure 1. *Emojis selected for expressing emotions*

For the same task we implemented a computer user interface intended to accomplish quick feedback on mobile devices for students. Our main design consideration is that the Interface should deal with the one-minute paper premise to leave feedback. For more granular feedback on the topic we made use of anchored comments inspired by the anchored discussions developed in [4,10].

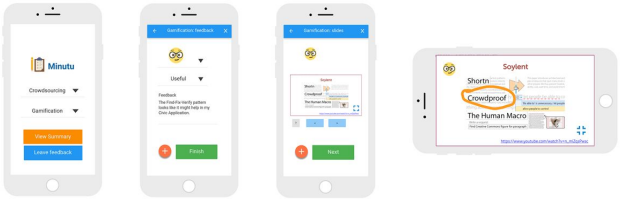


Figure 2. *User interface for leaving feedback.*

Figure 3. *User interface for mobile summary of emotions and popular comments.*

For the design of our application we used Emoji One[14] an open source initiative part of the Unicode Consortium which has openly available emojis to use in applications.

EVALUATION

Minutu first iteration the wizard of Oz prototype.

For our intended prototype we created a mobile application on Ionic 2 [15] that was a wizard of oz

prototype to test the process in the mobile application with the anchored comments.

From the feedback from 6 users we got some new ideas to implement about how to make comments binded to multiple anchors. Overall, they liked the ease of use of the application, the minimalistic design and they recommended to change the upvote and downvote to probably just upvoting. Especially one user (U1) who was not familiar with interfaces to upvote and downvote mentioned that it was difficult. U1 mentioned she felt more familiar to upvote or like, she mentioned the example of the Facebook like.

Comparing experience with anchored comments with emojis and without emojis.

We created a second activity to validate the user experience of emojis and the emotional connection that users create when attaching them to their comments. For that activity we created a focus group with two groups of 4 people who participated in leaving comments on a presentation from the class CS492: Crowdsourcing. The presentation was created by a student participant who reviewed 3 papers presented on class. We came across some meaningful experiences.

The users who weren't meant to tag their comments also left some comments about their confusion experiences tagged with some text emoticons attached to them. In the Figure 4 we show two examples referring to confusion and design of visual aids for the topic.

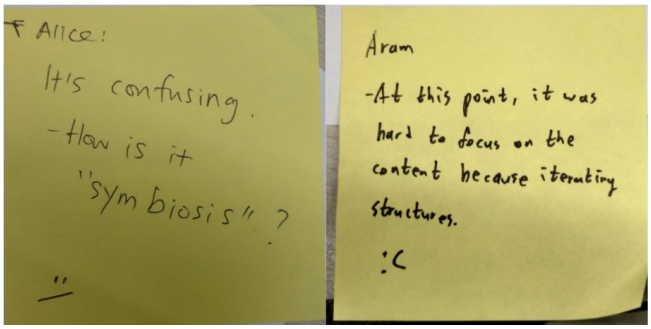


Figure 4. *Feedback that wasn't meant to use emojis*

In the same exercise we made an exit poll for the participants of the focus group. The purpose of the exit poll was to see how the users connected their current emotion to the given emojis. From there User 2 (U2) made a comment, he wasn't sure about how to represent his current emotion. It seemed U2 had a dilemma for the interpretation of the emoji number 3, that you can see in Figure 5. He said: "What is emoji number 3 supposed to mean?", he was not only thinking in just picking the one of his own interpretation. But, rather he was wondering what was the reference for interpretation of the emoji. This gave us a new hint for research.

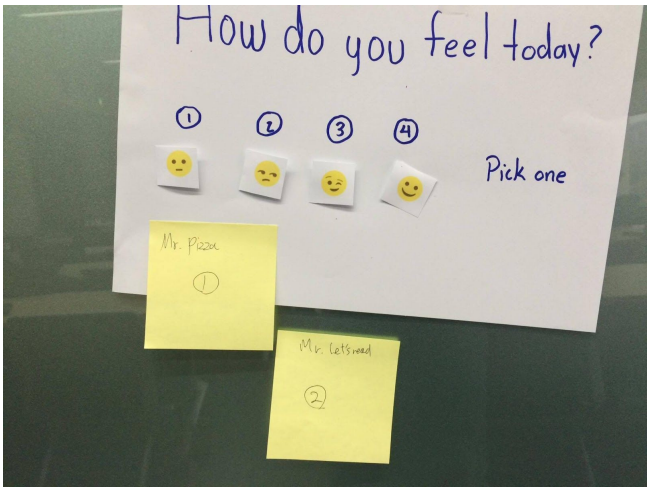


Figure 5. *Exit poll for focus group*

Testing interpretation of emojis in different cultural context

Since, the key feature of Minutu is emojis, we made the online study with 108 participants who answered an online survey to test the expressiveness of emojis to the given emotions we previously tagged.

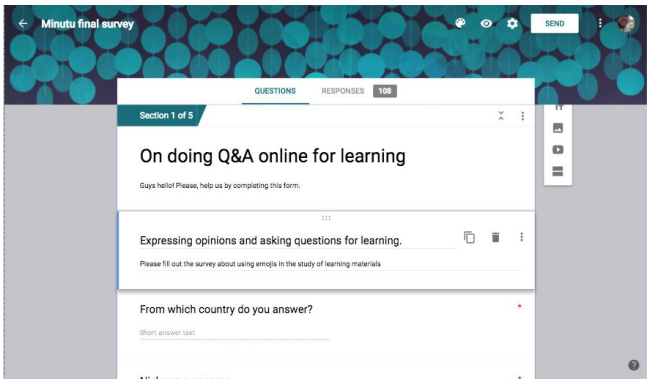


Figure 6. *Online survey*

For this stage with used Google Forms to create an online survey available for sharing. The sample was composed by 72.2% of people answering from Mexico, the rest were minorities with less than 7% of the total population from different countries like

Kazakhstan, France, USA, Chile. The target people were people who knew how to program and learn programming skills online.

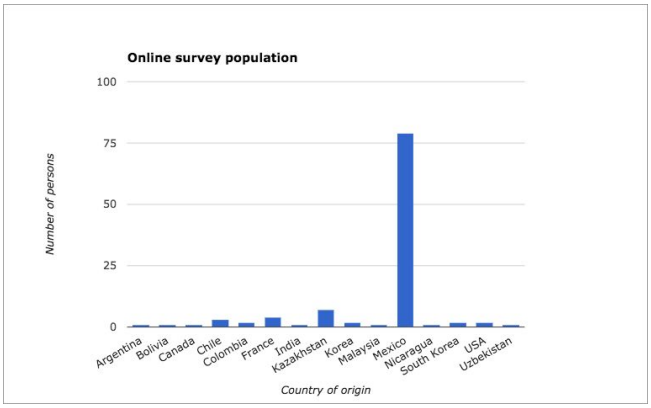


Figure 7. *Countries where the survey was answered*

In the survey, 82% of the participants agreed that a comment with an emoji provides more information about their feelings in a question. The same people think that their emotions are connected to emojis and 62% of them prefer to ask a question online by using a nickname instead of their real name. This give us, an insight that people think they can express their feelings more effectively by using emojis in their written questions and when they use them, their emotions are linked to what they wrote. ;-)

In the same survey we found that the reference of some emojis didn't matched effectively the emotion we had assigned previously, see *Figure 1*. For confusion 50% of people thought it expresses confusion, for expressing interest in a topic only 41% of the people thought it was right, but for expressing something is valuable 63% of people thought that it expressed that feeling. This give us an insight that probably the interpretation of emojis is different across cultures, it differs among people or maybe both at the same time. Even, there was an emoji that seemed more effective it is not effective enough to consider it as a valuable reference for everyone.

In our online study, we were also interested in some other details which can affect the efficiency and the quality of delivering a feedback while learning programming skills online.

Learning online from videos and presentations

We cascaded a group of our sample for a second part of the survey. For this part of the survey we wanted to know how people use videos and presentations to learn new skills. There is a format that is very common for informal learning technical skills among computer programmers and engineers: the Techtalk. This format is usually held in informal or formal environments. They can be the recorded videos from Programming Conferences, one of the most famous is Pyvideo.org from the Python Community and Python projects around the world; Meetup presentations which are 20 to 30 minute presentations for sharing knowledge in a given programming or programming-related topic. This presentations have created a niche for websites where people share talk presentations. Some online examples are slideshare.com and speakerdeck.com, however there is usually few interaction among this presentations that are used by the online community to learn.

For this stage of the study we got 91 responses from programmers that range novice programmers with less than one year of experience to programmers with more than 10 years of experience.

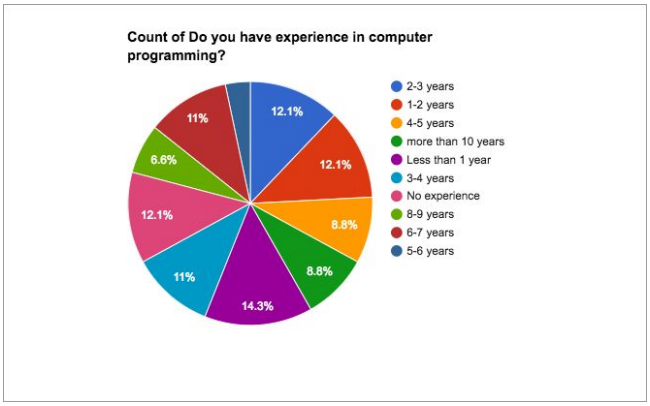


Figure 8. *Years of experience of the sample that learn programming online.*

In this stage we wanted to get an insight about how people use presentations for learning from online and how they use them to learn effectively.

We found that people 'agree' that they learned from the presentation slides, however, they tended to 'Neither agree nor disagree' about the objective. Which gives us an insight that most of people use them but they don't agree they learn only from the presentations. We mention because we found that

57% of people use Video to complement presentation slides to learn, 23% code repositories and 20% blog posts.

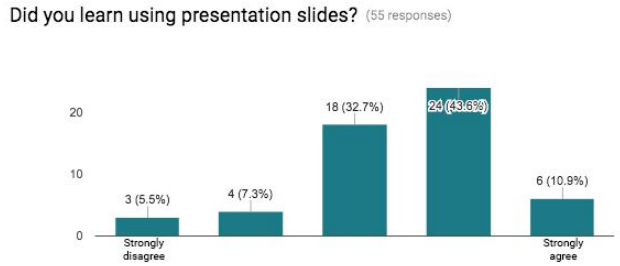
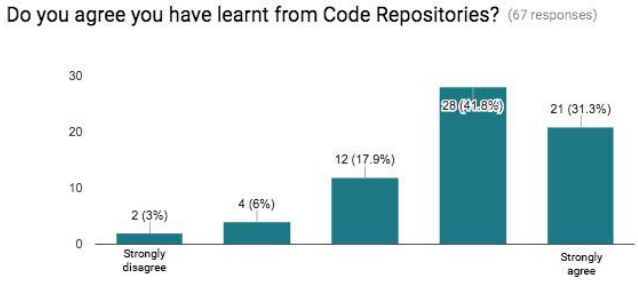


Figure 9. *People agreement on learning from presentation slide.*

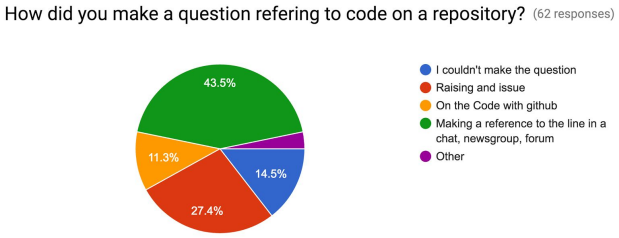
To make a second validation of our anchored comments on presentation slides we asked this sample if they ever felt like they would like to make questions referring to a slide section and 91% of the participants think it would be useful. Also, 75% of the sample thought they would like to ask questions on code repositories.

Code Repositories: a working environment where people learn how to program.



Some websites for social like Github.com have promoted the social development of Open Source Software since 2008. However, the interfaces Github has created are meant for the development of Software. However we wanted to know if our respondents would like to learn from code repositories, which are intrinsic related for development tasks.

Among the respondents we found that code repositories are more effective means for learning programming skills. We found that 31% of people strongly agree that they have learnt from Code repositories and 42% agree they have done it. Moreover, 92% revealed that they have wanted to make questions on code repositories.



However, 14 percent of the respondents could not ask the question, 39% asked the question in the Github UI on the code or by using issues which is not a UI meant for learning purposes. Finally 43% of the respondents created asked questions in other media like chats, newsgroups of forums, which usually are other places where the information is sparse and cannot be used in place for Learnersourcing[13].

DISCUSSION

During the validation, iteration and study of possible contexts where Minutu we learned different lessons around users who have an intent for asking questions and expressing themselves in the learning process. Firstly we found that users find a meaningful connection with the use of emojis when they express an opinion and that they feel their emotions are binded to their use. Then we found that users even without an explicit motivation of using text emoticons or emojis they tend to use them to complement a comment with the emotions they are feeling. We also found that emojis can be difficult to interpret according cultural context or by the use to refer to one's emotion or to reference of a common people's emotion.

We think there could be further research for cultural interpretation of emojis and people's intrinsic interpretation of them, also by referring to them as a common convention among people for interpreting them.

Later in our second study online we found that people that use presentation slides online to learn, not only learn by using them only, but they use other aids learning media in order to learn from presentations. We found that presentations that are meant to be used for learning after techtalk presentations are better used for learning when they are accompanied by a video or code repositories. Even though code repositories are tools meant for software development we also

found that a lot of people use them for learning purposes. This insight bring us to question about the proper User Interface design for letting the community crowdsource their learning. We think that presentation slides can be further improved by anchored comments and videos to let the crowd contribute novel, creative contributions for future learning[13].

We think that for a better intrinsic crowdsourcing design of Minutu we could try to improve the learning experience from the activities learners make in-person classes or talks with the activities they perform later to reinforce learning. The provision of the adequate e-learning materials for later revision and the use of timely feedback to sense the collective dynamics of the learning process seem to be a an improvement of the One-minute paper technique. Even though the One-minute paper technique has intrinsically been identified as a modest, relatively simple, low tech-innovation[2]; it can be complemented by the use of applied computing for education to leverage the crowd contributions and let them contribute to their own learning.

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Link to the videos:

bit.ly/minutu_video_motivation
bit.ly/minutu_video_final