Using Social Media Behaviors to Design Language for Advancing Pedagogy and Assessment

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Abstract: As engineering education propagates into K-12 education, questions surround pedagogy, curriculum, and assessment and instructors are challenged when it comes to measuring and documenting learning. This project uses captured video observations to model social media interaction behaviors and use them as the infrastructure to design a text messaging/IM language for classroom use between students and teachers. The language will serve as both a pedagogical and assessment tool.

Introduction and Theoretical Framework

Engineering education integrates pedagogical techniques from technology education, science education and design education. The studio critique and design notebook are two components of design education employed in an applied science/engineering summer course for rising high school seniors. The dialogue between student and design notebook, with each other and teacher create a rich medium for evaluating student understanding (Svarovsky & Shaffer, 2006) and can be seen as an epistemic triangle where dialogue can be analyzed because reasoning occurs (Atwood, Turnbull, & Carpendale, 2010).

Research shows that when comparing various forms of media (paper, photographs, in situ video), that students do not write down everything that might help instructions trace their rationale and thought processes. In situ video reflected evidence of valuable reflection and iterations in brainstorming sessions and studio critiques through natural verbal language that written language could not capture (Author, 2012). The natural extension of the research is to review video and take advantage of the ways youth use text messaging and IM to make communication more efficient and interactions within a class and instructor richer. Youth already use text messaging, sending up to sixty a day (Lenhart, 2012). Twitter and text-messaging tools have been shown to increase motivation to write and interactions between students (Tomita, 2009) and instant messaging (IM) is "real-time written discourse (Ferrera, Brunner, & Whittemore, 1991). Text messaging and IM allows teens to multitask (Nardi, Whittaker, & Bradner, 2000) and the delay in IM and text-messaging allows space teachers to respond and react to questions or ideas. Use of such a tool based on IM and text-messaging offers a synchronous, written communication that is culturally natural which that has a shorter turnaround time than grading journals or teachers watching video to youth.

If we viewed each individual classroom as a community of practice (Wenger, 1998), knowledge and communication can be created within the community if students and teachers were given an infrastructure for communication and documentation. Rather than creating a language tool without student participation and superimposing it onto their natural tendencies, we use collected data reflecting their natural communication patterns and behavior to increase authenticity and reduce the disconnect between the language that instructors want students to use and the language students actually use.

Method and Preliminary Results

Twenty-two low SES public high school students participated in a four-year college preparation program for disadvantaged students. These students are expected to be the first generation within their family to attend a four-year university. The students are first generation immigrants from Africa, the Caribbean, and South America. Most of them speak English, a native language, and a cultural dialect and come from homes where English is not the primary language. At the time the data was collected, students were rising seniors.

Students matriculated from multiple cultural and language backgrounds, so switching between multiple languages occurred. Because this group of students had been together socially and academically for approximately four years, they reflected a community of practice because of their shared mission, goal of college attendance, and indoctrination of the programs' beliefs. There was non-academic language because the class was conducted as a reality show and students were relaxed and comfortable with ongoing video, but non-academic language is not the concern of the research.

This video data is analyzed using grounded theory (Strauss & Corbin, 1990) to identify communication patterns and common language features. The types of video scenes analyzed include brainstorming sessions, small group work sessions, and final presentations. Themes were generated from coding that form the categories of interactions that happen between students. Initial coding results are shown (see Table 1) and we expect to broaden the interaction categories as we validate these codes on new video clips in rounds two and three. Some of the categories have subcategories because there were examples of more than one type. Questions occurred many times but had different purposes and motivation.

Table 1: Categories of Interaction Behaviors

Interaction Behavior	Type
Question	Why interrogative, how interrogative, redirect question, clarifying question, reconsider question
Mind change	
Reasoning	Layering idea (broadens idea), deepening idea (digs into idea), constraint, consideration,
Identify problem	
Decision	Confirmation, selection from options, Completion
Choice	Binary selection, range
Action plan	
Fix	A response
Checklist	
Lightbulb recollection	
Uncertainty	I don't know, I don't remember
Cancel	"Nevermind"

Conclusion

The results of this study will offer researchers and educators interested in pedagogy and assessment an efficient pathway for communication, interaction, and observation of classroom interactions using a cultural language shared by both. The experience and success of students using a cultural language in an environment where cultural language is often unacceptable can be compared to students who are forced to continue to only express their thinking using acceptable language. When the categories are defined and later tested, the data can then be used to create an application, design rationale tool, or digital design journal for use in K-12 settings that allows instructors to see process knowledge. If the language is tested and proven as a valid medium for pedagogy and assessment, it can be adjusted for application beyond STEM courses and formal classroom settings. The next steps beyond attaining access to process knowledge would be to identify ways to measure change and validate those changes in overall assessment of student knowledge.

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