
Midterm Report: Talkwall

How can visualizations of Talkwall activity support dialogic teaching?

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Introduction

Talkwall

[Talkwall](#) (Nesnass and Toussiant, 2016) is a free, web-based tool developed as part of the UiO pedagogy research project [DiDiAC](#) (DiDiac, 2016). The project is a collaboration between the University of Cambridge, the University of Oslo and the Research Council of Norway. TalkWall is meant to aid teachers in leading discussions and in encouraging students to participate in a class dialogue. According to an internal DiDiAC document's project statement (DiDiAC, 2017), "Talkwall is designed to promote collective classroom interaction and to provide a digital link to the high-quality discussion that aids learning." Talkwall's structure and design is inspired by pedagogical research theories for collaborative learning in classroom settings, which uses elements of dialogue-based approach (DiDiac, 2016). In addition, Talkwall also aims to support the development of students' critical thinking skills.

The general workflow and functionalities of Talkwall can be summarized by three actions: *question*, *respond* and *share* (Digitalised Dialogues with Talkwall, 2017). The teacher poses questions or challenges, which are displayed in the top banner of the GUI (see Fig.1). Students contribute dialogue via digital devices and contributions can be edited by its creator and also extended by other students in the class using the feed on the left side of the interface. Additionally, contributions can include a hashtag symbol ("#") in order to highlight important and/or task related words.

Contributions can be "pinned" and/or moved onto students individual walls. The teacher also has the ability to view each of students' individual walls. Filtering of contributions is done using hashtags, and is controlled on the right hand section, and can be used to highlight especially relevant contributions. The teacher may design multiple "walls", each with different topics or questions, to help organize discussions. These walls can have some degree of customization using simple templates (for example, a wall can be partitioned with a left and a right side). The teacher can create and control the Talkwall session's availability.

A Talkwall session has a flexible lifespan, as the teacher can close a session at any time, either permanently or temporarily. By design, Talkwall is able to maintain sessions over a longer period and is not limited to the typical timeframe of a physical classroom session.

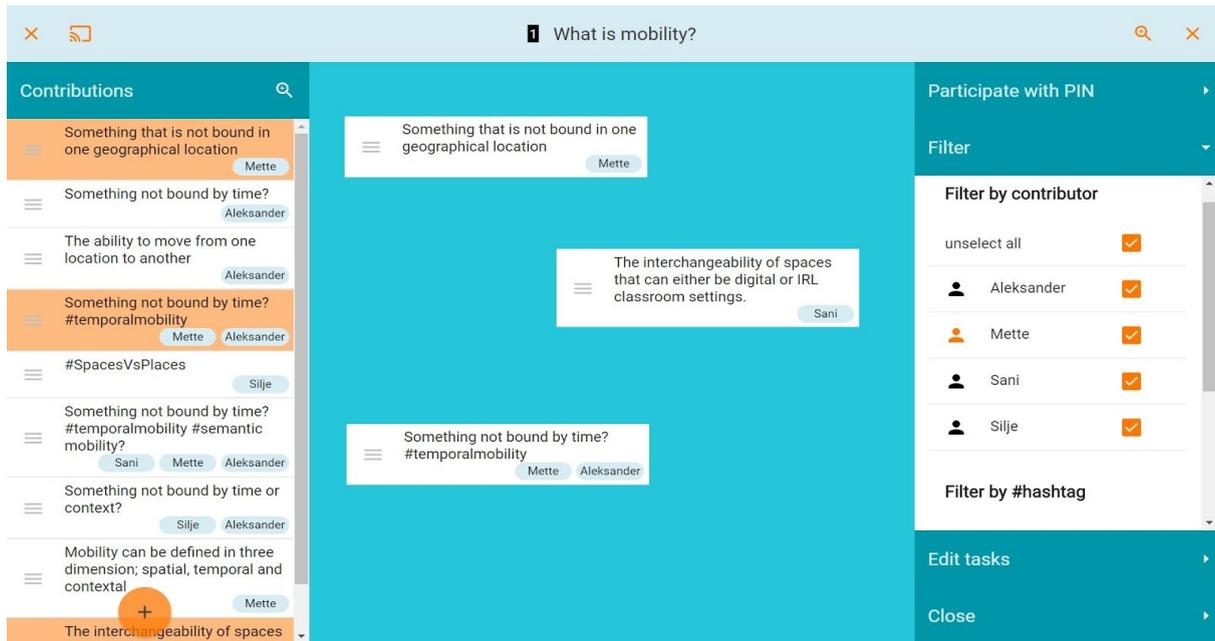


Figure 1: Displays 3 sections of Talkwall interface.

The Talkwall project is still under development and is being tested in selected schools. We want to contribute to the project by investigating ways in which visualizations of the data tracked during Talkwall sessions can help support collaborative dialogues. The goal is to transform data from a given time interval into useful information in order to support teachers' formative assessment of students' development and understanding.

Project background

Problem statement

The main problem statement in the DiDiAC task document we were provided is "How can automatically generated computer reports of participation in micro-blogs assist teachers in their assessment of students' learning?" (DiDiAC, 2017)

Our project will focus on investigating how visualization of activities can improve formative assessment and support teachers in promoting dialogical thinking. More specifically, how can we provide useful representations that fit into teachers' interactions with Talkwall? Which visualizations are relevant in the process of planning a session, during a session, and during analysis of sessions?

Why visualize?

Statistics such as of tables of data are not always easy to interpret for educational system users (teachers). Representing the results obtained with Learning Analytics methods in a user friendly visual form might facilitate the interpretation and the analysis of the educational data (Chatti et al., 2012). Mazza (as cited in Chatti et al., 2012) stresses that thanks to our visual perception ability, a visual representation is often more effective than plain text or

data, but the difficult part is in defining the representation that effectively achieves the analytics objective.

Mobility in in an educational setting

Kakihara & Sørensen (2002) expand upon the concept of mobility to include *contextuality*, and argue that “contextuality in which the action occurs is of equal importance in organizing human interaction” (p. 4), that is, interactions are shaped by their *context*, just as they are by *where* and *when* they transpire. During a classroom session, data about the current interaction is being gathered and the teacher can make on-the-move judgements about the levels of critical thinking and dialogic learning happening in the classroom, and adapt accordingly. Out of session, stored data about these interactions can be transformed and represented differently in order to facilitate an analysis context. We argue that mobility in an educational setting as described above overlaps with the field of Learning Analytics as defined by Siemens, and Gašević (2012):

“As with most IT systems, the student’s interactions with their online learning activities are captured and stored. These digital traces (log data) can then be ‘mined’ and analysed to identify patterns of learning behaviour that can provide insights into education practice. This process has been described as learning analytics. The study of learning analytics has been defined as the “measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs” (as cited in Siemens, Dawson & Gašević, 2015, p. 1).

Theoretical framework

In this paper we draw upon both technological and pedagogical research. From the technology perspective we define the concept of mobility and connect this with Talkwall. The context is important for a tool that is used in education and the goal that the people have in that context. To better understand the context the second part of our framework will define dialogical thinking and why this is important in a classroom. At the end of this section we will look at ethical aspects to consider when using Talkwall in education.

Traditionally mobility has been connected to our ability to become more independent from our location as technology has made us able to travel larger distances in a short amount of time (Kakihara & Sorensen, 2001). In an article from 2001 Kakihara and Sorensen argues that mobility could also be tied to interaction between people as technology have made communication and interaction more mobile, as we have argued in the above section. They expand the concept of mobility by splitting it in three different dimensions; **spatial, temporal and contextual**.

Spatial mobility involves not only movement of people, but also how our spaces and symbols are being moved digitally (Kakihara & Sorensen, 2001, p. 34). Talkwall can be seen as a space that changes the interaction between students and teachers in the classroom making it possible for more people to interact with the artifact blackboard. The students are able to build on each others comments and thus interact in new ways. Spatial mobility in Talkwall

can thus be described as a new opportunity for externalizing dialogic thinking and collaborative participation in a digital space.

Kakihara and Sorensen categorizes temporal mobility as either monochronicity or polychronicity, while contextual mobility can be defined to be within two ranges: obtrusive to unobtrusive and ephemeral to persistent (2001, p34-35). They describe monochronicity as circumstances where people want to structure their time and plan ahead as opposed to polysynchronicity which are situations where we can do multiple things or diverge from our planned schedule. The increased mobility we gain from technology is also visible in how we spend our time and when we can spend time on activities. Traditional blackboards are limited to the time we are physically present in the classroom. Talkwall is meant to be used in the same context as blackboards with guidance of a teacher, but the technology is more temporal and contextually mobile as the teacher and students can interact with Talkwall outside of the classroom and as long as the session is running.

Wegerif (2015) discusses how technology is not only a product of thinking, but also changes and enhances how we think. He reflects upon the term “Higher order thinking” or “good thinking”, which he argues involves reflection and multiple perspectives and which therefore can be thought of as “dialogic” rather than “monologic”. He then discusses how the way we think has changed during the past century (“The Flynn effect”) and reasons that this is not only correlated with, but even caused by, the technological advancements in education and literary practices (p. 428-429). He then goes on to name four conceptualizations or roles that technology can play in education (p. 432-438):

- As a direct tutor of thinking, for example through pre-programmed behaviour such as automatically asking students questions that inspire critical thinking (or more complex, artificially intelligent behaviour).
- As a tool for thinking, ie. as an instrument to “shape attention and make distinctions”, for example as a system for mapping and organizing knowledge.
- As an environment for thinking through building and reflecting upon models in a virtual space.
- As a way of expanding and resourcing dialogic space, because technology opens up new possibilities of communicating different perspectives. “[...] it carries the dialogues that unite diverse voices whilst maintaining their separation.”

To be filled in later: Knowledge integration med “social learning analytics: five approaches”

Earlier in the report we talked about the positive changes Talkwall can give in a classroom setting, but sometimes new technology comes with unforeseen challenges. It is important to be aware how Talkwall affects the classroom setting. In the amish community they look not only at what technology does to an individual, but rather how it affects the needs of the community (Rheingold, 1999). Talkwall requires students to have their own device to connect to the web, so if someone forgets their device they also lose the ability to interact with the tool and the class online. The students can also be anonymous in talkwall which can lower the barrier for bullying other students during the class. Fortunately both of these situations can be controlled as the teacher is the administrator of the Talkwall session and

the leader in the classroom. They can assign the students an identity that they know and they can organize them in groups if someone has forgotten a device to log on the web.

Method

The methods in our case are qualitative and includes interview, review of field observations and logs. Looking at videos of talkwall and participating in a class that used talkway was a way for us to put the context in focus. The aim of these methods in the first stages was to gain enough data and knowledge to build a foundation for the next stage where we create prototypes and scenarios.

Unstructured interviews/talks

In order to gain a basic insight into the topic we have had a session with researcher Ole Smørðal, focusing on their product, Talkwall, it's current functionality, and how it as a tool for digital dialogs can contribute to classroom participation and critical thinking. This talk gave us a basis for further research. Additionally, we gained some insight into the direction in which the DiDiAC researchers are interested in taking Talkwall.

Review of Talkwall use

As part of getting to know the current features and uses of Talkwall, we have reviewed logs from classroom sessions where it has been implemented as a learning tool. These logs contain data and metadata about the digital events that have transpired during a session and can be generated after a session and reviewed by researchers or teachers interested in analyzing student participation and knowledge. Additionally, we were able to review video excerpts from some of these classroom sessions. The video shows us the use of talkwall in a natural setting since the context for use is important. This is more in line with newer studies within mobile HCI that focuses on field studies and the importance of context (Kjeldksov & Paay, 2012). From the video we have observed and highlighted some interesting patterns and use trends which have given us some basis for developing design suggestions for visualization tools. Through a lecture at we attended on Learning Analytics we also observed an example of Talkwall being used as a flipped classroom tool. We will talk more about this data in the *Logs and observation section*.

Prototyping and user testing

We are interested in prototyping several visualizations of classroom data. We will initially develop a few scenarios based on what we have learned about the various ways teachers and students currently use Talkwall. For each scenario we will develop one or more wireframe prototypes illustrating possible uses of data visualizations. In this design process, we will draw on existing theoretical models and frameworks on social learning analytics such as those of Ferguson and Buckingham Shum (2012) and Chatti et al (2012). Finally, as teachers are the main organizers and evaluators of the teaching sessions, we want to evaluate these prototypes with teachers who are already users of Talkwall, focusing on the

perceived usefulness in supporting the teacher in facilitating and improving classroom discussions and promoting dialogical and critical thinking. During the evaluation, both scenarios and wireframe prototypes will be used in order to instigate and support feedback and discussions.

Current findings

Logs and observation

During discussions and observations we gained insight into several interesting cases and trends in the use of Talkwall, both in and out of typical (physical) classroom settings:

- Students would often post their own contributions at the start of a classroom session, but later they were more likely to simply move either their own contributions or the contributions of others around on the wall. The option of building upon/editing other students work was to little extent used in the logs we reviewed.
- We saw examples of group dialogues where the students pinned and highlighted contributions on their wall and discussed them in depth.
- In one of the video recorded sessions we observed a teacher using Talkwall as a presentation tool, where students were asked to share their contributions by sharing and pointing to contributions on their “wall” in front of the class.
- In one case, the hashtags (#) was used as a tool for organizing contributions. In the session, students were tasked with creating contributions based on a given topic, then tag these contributions with the same topic using hashtags.
- Students often seem to prefer pinning their own contributions rather than the contributions of others.
- In some logs we saw examples of what we call “sabotage”, where some student groups made contributions that were not considered appropriate or meaningful to the conversation. These “contributions” were sometimes in the form of expansions or edits that obstructed a contribution from another student or group.
- A common observation was the dialog between the students when they made, pinned, categorized or moved contributions on the wall.
- We learned of a case where the teacher had handed out notes with usernames to be used by students in order to anonymize them to others (as opposed to the typical use, where students pick a username for themselves or their group). This technique made it possible to use Talkwall in a class on sexual education, and made students able to more freely ask difficult or “embarrassing” questions because of their

anonymity.

- We observed (and participated in) a *flipped classroom* case where the lecturer created and posted a Talkwall session with “homework” tasks in order to prepare students for a lecture. Students were instructed to create contributions to the Talkwall related to a set of papers to be read by the start of the lecture.

Scenarios

Based on our research so far, we will identify five possible scenarios that we wish to explore further. These will be developed as we explore ways to visualize the data for the teacher.

Early Design suggestions

Todo.

The way ahead

- Expand upon Ferguson, Shum, 2012 visualization ideas for interactions and also D3js.org as inspiration.
- Further develop the GUI for the teachers visualization from the excel sheets that researcher have used to present data in their research.
- Prototype testing with our focus group, teachers for usefulness of visualization.
- More on ethical issues.
- Expand theoretical framework section: *Knowledge integration i social learning analytics: five approaches”*

References

Chatti, M.A., Dyckhoff, A.L., Schroeder, U. and Thüs, H. (2012). A Reference Model for Learning Analytics. *Int. J. Technol. Enhanc. Learn.* 4(5/6), p. 318-331.

Universitetet i Oslo (04.05.2016). DiDiAC - Digitale dialoger på tvers av fag. Retrieved 11.10.2017 from <http://www.uv.uio.no/iped/forskning/prosjekter/didiac/>

DiDiAC, Internal Document. Sent as personal communication on 30.08.2017 by Ole Smørdal.

Digitalised Dialogues with Talkwall (n.d.). Retrieved October 10, 2017, from <http://digitaledialoger.no/>

Ferguson, R, and Shum, S.B. (2012). Social learning analytics. *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge - LAK 12, 2012.*

Gašević, D., Dawson, S. & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. *TechTrends*, 59(1), p. 64-71.

Kakihara, M & Sorensen, C. (2001). Expanding the 'Mobility' Concept. *SIGGROUP Bulletin December 2001* 22 (3), p. 33-37.

Kakihara, M & Sorensen, C. (2002). Mobility: An Extended Perspective. *Proceedings of the 35th Hawaii International Conference on System Sciences (HICSS-35'02).*

Richard Nesnass & Jeremy Toussiant (2016). Talkwall [software]. Available from www.talkwall.net

Rheingold, H. (2001). Look who's talking. *Wired magazine*. Retrieved 11.10.2017 from <https://www.wired.com/1999/01/amish/>

Wegerif, R. (2015). Technology and teaching thinking: Why a dialogic approach is needed for the twenty-first century. *The Routledge International Handbook of Research on Teaching Thinking*. Abingdon Oxford, UK: Routledge.