The use of Social Media to augment an authentic Learning Project in Engineering Education

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Abstract

This paper is about the experiences with an authentic learning concept and the use of the social enterprise network Yammer to augment the communication and learning process. In a third year integrative bachelor course on Management in High Tech Organizations, students work in multidisciplinary teams on factual assignments from real companies. Part of the work lay out in these companies is the use of social media platforms for internal communication. Yammer was introduced to mimic this situation and allow for better communication in the teams and with their coaches. In this paper we explore how the students experienced the authentic learning approach in connection with the use of Yammer, as a medium that intends to boost communication processes and therefore should alleviate a positive experience for the students and the coaches. The outcome shows that Yammer helped the teacher-coach, but did not very much inspire the student.

Keywords: Engineering education; integrative course; authentic learning environment; social media.

1 Introduction

In the minor 'Management in a High-tech Organization' at the Delft University of Technology a lack of integrated learning opportunities was perceived by students and staff. The minor is offered to students in the first semester of their third year of undergraduate study. The goal is to provide an introductory and general view of topics in management practice in a high-tech context. The minor offered separate courses on corporate finance, high-tech marketing, human resource management, innovation management and strategy, but failed to integrate the different courses into a meaningful whole. Therefore an integrative course was developed to provide the learners with the opportunity to understand and apply knowledge and skills as obtained in the different courses coherently. Several different media were used to support the learning and working processes in the course, but in this paper we specifically look at the use of Yammer, a medium qualified as a tool that boosts collaboration, communication and productivity (Yammer, 2013).

1.1 The pedagogical design and tooling

For the pedagogical design of this course a set of requirements was used based on learning goals, student prior knowledge, study field, working experiences, personal learning demands, the number of students, the time period, and others. The model should allow for active and collaborative learning in an engaging learning environment. The authentic learning approach qualified itself as the most appropriate pedagogical model for the aim of the integrative course (Herrington, 2006; Collins, 2011). Authentic learning is an approach to teaching and learning that allows for blending different kinds of learning and to give students opportunities to think and act like professionals but in a learning or training setting. In a physical sense it is easy to organize, but in a pedagogical sense it needs a clever design to deal with the tasks and the limitations imposed by the curriculum and institutional constraints.

The objective of the course was to have the students experience the use of their acquired knowledge. This was done in a case based setting which impersonated the authentic learning environment. To simulate a real life context it was decided to use job roles (consultant and manager) to give students the opportunity to think and act like professionals with tasks and assessments that are based on these roles. The course consisted therefore of a consultancy learning cycle (consultancy report) and a management learning cycle (management game). The consultancy case focused on an assignment from a real technical company that was negotiated with the firm and covered concrete problems and demands. A management game was used to mimic the management case, for which we chose the TopSim General Management Game from Tata Interactive based on a list of requirements (De Vries, i.e., 2012).

Special attention was given to the tooling for the course to support the learning and communication processes, but also to get as close to reality as possible in the framework of the authentic learning approach. The tools used in the

course included Blackboard, the institutional learning management system which served as an agenda and library, and other tools like SMS, Google-mail and Google-docs, presentation tools like Prezi and a management game. During the last two years of a four year period in which the course was offered, Yammer was used as an enterprise social network to augment the transparency of activities and achievements during the course by concentrating on the information exchange between all participants through this medium which was available at no cost at university level.

1.2 The research approach

The pedagogical design was built on several learning theories and new insights related to the use of media for learning. The authentic learning approach was the context in which this design was materialized, expecting that the approach would allow for the different competencies to develop into a meaningful whole. It was not the intention to formalize this integration, because the minor was open for all students at the Delft University of Technology and beyond with very different backgrounds, pre-knowledge and different learning experiences and in some instances different demands. An authentic learning environment is an organizational framework that partially takes shape through the contribution of the participants as the course progresses. Therefore it was decided to take the different user perspectives into account to judge the usability of Yammer in such a learning context. The data used are from 2012 and comprise the yearly institutional evaluation survey, which is a general assessment of the quality of the course, including structure, content and teacher performance. In the evaluation special attention was given to the use of Yammer by integrating additional questions in the formal educational survey and data taken from interviews with the teacher-coaches. In this paper we explore how Yammer was used in the authentic learning environment and how the participants perceived this medium.

2 Yammer: the medium is the message

Social media increasingly influence the way people organize their personal life, their work and how and what they learn. Students in general use social media to stay in touch and tend to use these media for communication and collaboration purposes in a learning setting. In the integrative course we offer an authentic learning environment, where the students work in multidisciplinary teams supported by a coach on factual assignments from real companies. Part of the work lay out in many companies is the use of social media platforms for communication and collaboration. In this project Yammer was introduced to mimic this networked situation and allow for better communication in the teams and with their coaches. Yammer is a tool that is supposed to boost collaboration, communication, and productivity and predominantly focuses on a business environment (Yammer, 2013). From an educational point of view it was important to track what was happening in the groups, to have a better insight in the process and improve the support by giving just in time, targeted feedback and communicate with groups more easily.

With Yammer the coaching team and the students had a private and secure networked environment which added an element to the authentic learning environment that was missing so far. Yammer is a Microsoft product since the end of 2012 and the intention of MS is not to change the character of the tool, but to promote integration with other MS products like Sharepoint and Office 386. The emergence of social networking tools is evident covering an area that is seemingly unnatural for the existing learning management systems, which have in general a limited scoop and are therefore gradually considered inadequate. Yammer is a communication tool and knowledge centre and looks and functions very similar to Facebook. In figure 1 you can see a snap shot of the course homepage in Yammer. Some of the elements on this page: on the left an overview of the working groups, in the middle section the blogging facility and more to the right organizational functionalities to add members, upload a file, and an information section about the purpose of this Yammer application.

We used a free version of the online Yammer software that supplied us with a limited, but useful number of functionalities. Users can post messages, including photos, videos and other visuals. Users can post it to the entire community or to a selected group of people or to a particular group and their members. Users can also send one-to-one message and users can make (sub-) groups that help to organize group oriented activities that are only available for subgroups. Users can develop notes as information resources relevant for the course process. There are features as ‘liking’ and others that stimulate and support communication on different levels. This all helps to arouse a sense of community without the necessity of becoming friends like in Facebook. Important considerations to select Yammer was that this tool does not have advertisements and runs on virtually every platform such as iPhone, iPad, Blackberry and Android and it allows to invite people from outside the University network to participate.

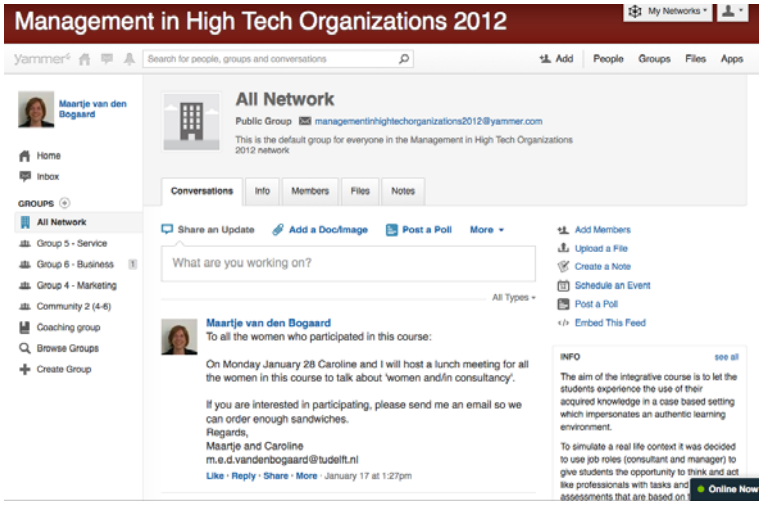

Figure 1: Homepage integrative course in Yammer

3 The Authentic Learning Environment

The aim of the integrative course is to let the students experience the use of their acquired knowledge in a case based setting, which mimics an authentic learning environment (De Vries and Van den Bogaard, 2009; De Vries, i.e. 2012). To simulate a real life context it was decided to use job roles (consultant and manager) to give students the opportunity to think and act like professionals with tasks and assessments that are based on these roles. The course consisted therefore of a consultancy learning cycle (consultancy report) and a management learning cycle (management game). The consultancy case focuses on a factual assignment from a technical company and covers concrete problems or demands. The assignment is discussed with the senior lecturers to make sure the case is fit for the envisioned kind of learning experience. For the management case the TopSim General Management Game from Tata Interactive based was selected based on a list of requirements from the teachers of the separate courses and requirements set by the integrative course team (De Vries, i.e. 2012). We do not discuss the game in this paper, because Yammer was not incorporated in the game.

The minor normally is fully booked, which means sixty students coming from different faculties or even from other universities. The authentic learning strategy requires participation of the students on all levels of the course to aid authenticity to the learning process. The participatory approach emphasizes self-directed collaborative learning with no lecturing, but with students being equally responsible for what is happening as members of consultancy teams and not as passive students in a classroom. Students work in teams of four to five members. Teams are randomly assembled and the groups stay together throughout the course. Teachers mainly operate as coach. In the next sections the structure and processes of the learning cycles are described and analyzed.

3.1 The consultancy learning cycle

The integrative course is planned in the 2nd quarter (November - February) of the academic year and the consultancy part covers the first six weeks till the Christmas holidays. There is one plenary meeting of two hours each week and multiple contacts of students and teachers using media and office hours throughout the week. Students have the responsibility to organize these gatherings and supply the structure and content. The learning cycle (see figure 2) is the overall structure to clarify the different steps needed in the process and is composed of five phases that range from exploration to the presentation of the final results.

The exploration phase comprises the introduction to the case and the consultancy methodology and is a collaborative action in the sense that all participants are involved in the organization and execution. An example: for the introduction on consultancy we use the book by Peter Block ‘Flawless Consultancy’ (Block, 2012). Student groups prepare a summary and presentation of one or more chapters and discuss this in class, while making the material

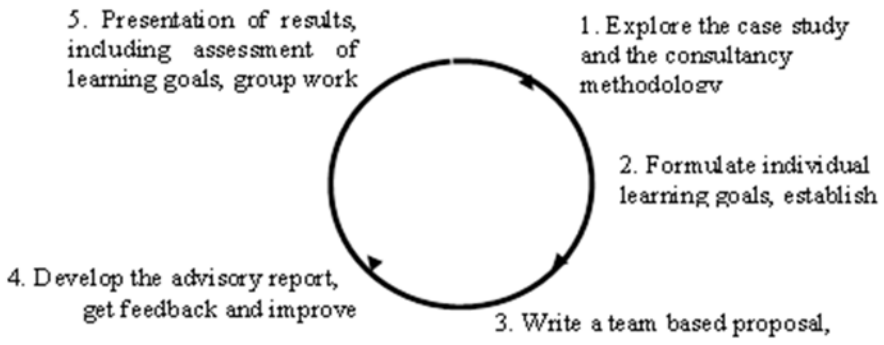

Figure 2: Learning cycle consultancy

available online before the meeting so others can prepare. At the same time related material is collected and put online for further reference and a direct link is made with the case study to see what is needed to deal with this task from the consultancy perspective. The same approach is used for all other phases. In the first four weeks the focus is on analyzing the problems from different angles. Student teams make an internal task division to develop a clear analysis of the problems the organization is facing. They present their findings as individual groups and discuss and negotiate with their peers and coach for further development and improvements (contact moments in weeks 2 and 4). Also the expert from the company might be involved using a Q&A format in the Yammer platform. The final three weeks are used to formulate a consistent proposal for the company to deal with the problems and present this during a plenary session with company representatives. The assessment is an on-going process due to the participatory approach in combination with self-assessment by the students concerning group performance, the quality judgment of the proposal by the company and the overall qualification by the coaches.

4 The design of the authentic learning environment

To make sure that the set-up of the integrative course complies with the authentic learning strategy a framework was constructed of ten characteristics to check the validity against (Herrington, 2006; Lombardi, 2007; Collins, 2011, De Vries, i.e., 2012). In the first column of the matrix (see table 1) there is an overview of the characteristics with in the second column the justification from the point of view of the consultancy learning cycle.

Table 1: Authentic Learning Characteristics

Authentic learning characteristics	Consultancy learning cycle
1. An authentic context that reflects the way the knowledge will be used in real life.	The consultancy task mimics the work many students will experience in their first job.
2. Authentic activities	The assignment comes from a real company with experts involved to judge the proposal on the usability
3. Complex tasks, which should collaboratively be executed over time as in a community of practice.	Students work in groups collaboratively, having different tasks, discussing achievements (peers, coaches, company representatives).
4. Different roles and different perspectives.	Students work in groups with different tasks. Collaboration is needed to fulfill the different roles (technical, financial, business, pr).
5. Collaborative construction of knowledge.	Proposals differ in solutions offered, quality, and usefulness as a result of this collaborative construction.
6. Opportunities for reflection.	In their group, during meetings where with other groups and during the coaching sessions.
7. Application of experience and lessons learned in different situations.	Students should use prior experience based on their background. This is helpful to qualify the different perceptions in the group.
8. Coaching and support.	Is integrated in the structure with the teacher who operates as coach and the student groups as peers.

9.	Authentic assessment: the development of a genuine product instead of an unrecognizable semi-finished product.	Students are also assessed by the companies' experts on the usability and quality of their proposal.
10.	Room for different solutions and end products.	Proposals often differ very much in the kind of solution, the approach, the viability suggested.

5 Results

5.1 The institutional evaluation report

The course was evaluated by the faculty's education office. Every year, students receive a short standardized anonymous questionnaire on the final day to score the course in terms of usefulness, the connection to prior knowledge, the assignments, the assessments and the coaches. In addition students are asked to fill out two open questions: what do the students appreciate about the course and what do they feel needs to be improved. The average scores and standard deviation are shown (figure 3) for five key performance indicators averaged over the three years in which the course has been taught.

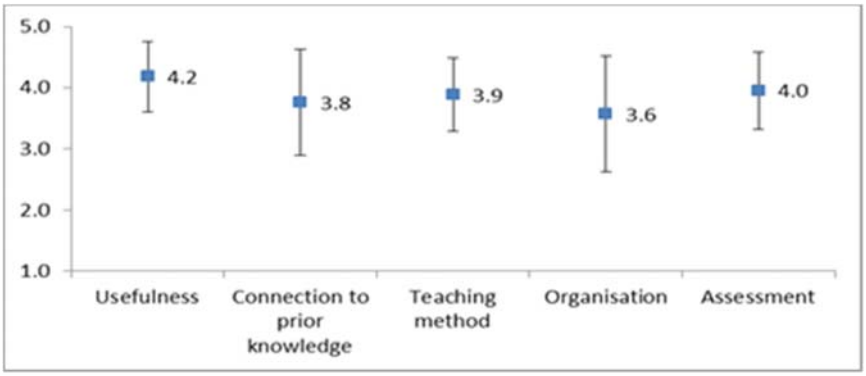

Figure 3: Institution's evaluation of the integrative course: average scores and standard deviations for five performance indicators (n = 127)

Students gave high scores to the course's usefulness (4.2 out of 5 points on average). Also, the course connected well to prior knowledge (e.g. the other courses taught in the minor: 3.8 out of 5 points). The employed teaching and assessment methods were appreciated by the students (3.9 and 4.0 points, respectively). Finally, the lowest score was given to organisation. However, we find this score is still well above the average. Students rated the course in general with a 7.5 out of 10. We found positive correlations between the general opinion on the course and three general education items in the questionnaire: 'in my opinion the content of this course was relevant to my education', 'the present course corresponds well with my prior knowledge' and 'the teaching methods used for this course are appropriate'. The correlations are reported in table 2.

Table 2: Spearman correlations of scores on learning goals and students' general opinion on the course. N=76. * Correlation is significant at the 0.05 level (two tailed). ** Correlation is significant at the .01 level (two tailed)

	General opinion	Relevance	Prior knowledge	Teaching methods
General opinion	-	.505**	.466 **	.368**
Relevance		-	.291*	.327**
Prior knowledge			-	.124
Teaching methods				-

We find the high and significant correlations between these three items and general opinion encouraging, as we understand these items as a reflection of students' appreciation for the course as an integration of the coursework in the minor and the authentic learning environment. We also find it encouraging that students who have a positive opinion of the Relevance of the course, also rate Prior knowledge and Teaching methods highly. These students seem to have caught on with the concept of the course.

In table 3 one can find an overview of the perception of students in relation to the characteristics of the authentic learning environment. According to these reactions the students feel that the course very much complies with the intended real world experiences as an important carrier for the knowledge integration.

Table 3: Top 5 of topics mentioned by the students of what they liked most and what should be improved in the course

	'Liked most'	**Number of times mentioned**
1	Game week	28
2	Consultancy case and possibilities for integration	18
3	Work in multi-disciplinary teams	18
4	Interaction with companies	11
5	Company visits	9
	'Need to improve'	**Number of times mentioned**
1	Course organisation and planning	14
2	More information on the assignment	11
3	More structure and support	10
4	Issues with Yammer	9
5	More information on expectations and deliverables	8

The course organization is mentioned 14 times as needing improvement. This is consonant with the quantitative outcomes of the survey in figure 3. Yammer is mentioned 9 times as needing improvement. Examples of comments on Yammer include: "Give some basic tutorial on the communication tool Yammer'; "Integrate Yammer with Dropbox so we can work on files together."; "Yammer is not efficient." And "Do not use Yammer!" Students also observe that the method of distributing information on the course schedule was not good and should be improved upon. This is also a comment on the use of Yammer, as this was the main medium for the course.

5.2 Specific issues concerning Yammer

The survey included five statements on Yammer which were rated on a 5 point scale. The statements were:

1 Yammer was easy to use.
2 Yammer facilitated the cooperation between the group and community.
3 Yammer reinforced the organization of the course.
4 Yammer helped me to stay on top of this course.
5 Yammer was of great value for my performance in the course.

These questions have high inter item correlations ranging from 0.56 to .77. The items load onto a single scale with a Crohnbach's alpha of 0.898. This means that these 5 questions seem to measure the same latent variable and are valid. However, the items on Yammer correlate with very few other variables in the survey. There are two correlations with the general opinion on the course and four correlations between Yammer and Relevance. These correlations are reported in table 4.

Table 4: Spearman correlations of scores on students' general opinion, Relevance and items on Yammer. N=76. * Correlation is significant at the 0.05 level (two tailed). ** Correlation is significant at the .01 level (two tailed)

	Yammer item 1	Yammer item 2	Yammer item 3	Yammer item 4	Yammer item 5
General opinion	.263*	.063	.267*	.174	.172
Relevance	.328**	.131	.373**	.266*	.232*

This indicates that students who rate this course highly, generally found Yammer easy to use and felt that Yammer helped them to be organized. The students who recognize the relevance of this course also score high on the Yammer items. There are no correlations between 'Method appropriate' and the Yammer items. Students apparently do not regard Yammer as part of the teaching methods.

5.3 Coaches' experience with Yammer

For only one of the coaches there are correlations between the feedback this person gave and the Yammer items. This was an interesting observation as the researchers knew that this coach was the only expert user of Yammer on the team. From this we deduct that the problems with Yammer partly have to do with the lack of Yammer skills of the coaches. The statements students make in the questionnaire reflect that the students found it difficult to work with

Yammer, but from experience we know that the coaches had their fair share of problems with this medium as well. Interviews were held with several teachers, including the veteran Yammer user, using the five statements included in the questionnaire as the outline for the conversation. These interviews were recorded and summarized.

Two novice teachers had experience using Moodle and Blackboard, but had little experience with Yammer. They found that some functionalities in Yammer were easy to use, e.g. the message board and the groups. The more advanced functionalities however, were not as intuitive. For instance it is possible in Yammer to give comments in a document, but there is no option to track changes in a document or to keep track of different versions of a document. These two teachers observed that most of the collaboration took place in digital environments outside of Yammer, e.g. in Google Docs and the teachers had no access to these digital environments. Although Yammer helped to keep track of course logistics on the level of the course, communities and groups, it was difficult to keep track of individual contributions and documents a few weeks in the course. The teachers felt that Yammer had supported the course in a more interactive way than Blackboard and Moodle could have supported the course. However, they felt they had not used Yammer in an optimal way and that it could have been implemented better if they would have known how to do this.

The expert Yammer user reported a different experience. He felt that using Yammer to communicate with students was a time saving experience with more options for timely feedback. The functionalities used most were 'like' as a positive reinforce, posting updates and feedback on documents. He subscribed to other group to see what was happening there, using the information as an inspiration for his own interventions. The added value of Yammer compared to the University LMS is that it lowers the threshold for involvement which includes the option for students to also work in a coach free group. The coaches also had their coaching group which supported the asynchronies collaboration among the coaches concerning content and decision making. Yammer is not user friendly and not well structured and therefore not suitable for extensive courses. It is effective to organize events, but does not help students to collaborate on documents or with other groups. Here Google docs or Dropbox seem to be a better fit. Community building was strong, but relied very much on the messaging functionality.

6 Conclusions

The paper dealt with the experiences of students and teachers using an authentic learning environment in combination with the social enterprise network Yammer that was integrated in the course lay out to augment the communication and learning processes.

The quantitative and qualitative evaluations show that the students perceived the course as an ample opportunity to integrate acquired knowledge while using it in practice. In addition the qualitative evaluation shows that students recognize the characteristics of Authentic Learning Environments (ALE) in the course design and the implementation and appreciate this concept very much as an important carrier for knowledge integration.

The way students and teacher-coaches experienced the use of Yammer in this course diverges. Students in general are less favourable about the usability of Yammer in the course setting. Although Yammer was positioned as the tool to use, it was perceived as not very user friendly, not efficient, not transparent enough, with flaws like document version management, collaboration on document level. The teacher-coaches were more positive and considered the tool helpful to improve time management, to improve the coaching process, to get a better view on the communication and learning processes in general. However, the coaches with little experience with Yammer had some trouble in using it effectively. All the coaches appreciated Yammer as a tool that was helpful for communication and decision making processes among the teacher-coaches. One of the lessons learned from this project is that although many of our students are social media savvy, they do not automatically catch on to new applications. The teachers have to be role models in the use of such an application if it is to be accepted by the students. Still, it is important to use a tool such as Yammer to adhere an authentic learning environment. Many companies are moving from intranet to more interactive and social media like tools for internal and external communication. In this specific course teams of students had to coordinate their work in relation to the complementary character of the assignments and this required an on-going exchange and transparency of the content development and the progress teams were making to be available in Yammer for everyone to see. In addition, it is important that teachers can monitor the learning environment to get a feel for how the groups are getting on with the assignments and with collaboration within the team and the wider community.

Obviously Yammer is not by definition a natural partner for learning related purposes, but it can support the organizational and coaching process when positioned correctly as a support tool for communication and information exchange in an authentic learning environment.

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