

Plan for research studies¹

Title of the study	Friend evaluation of course work with game elements
Responsible people	Håvard Lian (Researcher) Rune Sætre (Supervisor)
Time period for the study	Master's thesis
Amount of resources in PM planned	40 hours a week for two semesters
Web address for the project (if any)	

Change log for the plan (can be deleted before delivery)

Version	Date of change	What is changed?	The reason for the change
0.1	07. may 2016	First version.	

¹ This plan is based on the 6Ps of research as described in Oates, Dr Briony J (2005). *Researching Information Systems and Computing*. SAGE Publications, enhanced based on Creswell, J. W. (2014). *Research design- Qualitative, quantitative, and mixed methods approaches (4th ed.)*. SAGE Publications.

Purpose

The text describing my master thesis, written in conjunction with my supervisor is as follows:

“In order to make the exercise part of the (big) courses at NTNU more exciting, and to make sure all the students get all the help they need, a system where students can solve tasks, gain points and level up should be built and evaluated. The system will let higher level students evaluate other students' tasks as well as evaluating other students' evaluations. Students will gain points, achievements and access to higher level functionality by working with the system.

This system will be tested in courses at NTNU and possibly at HiNT.”

The motivation for this research started with professors at NTNU seeing problems with the current system for exercises, particularly in the bigger programming courses. There are simply too many students for each student to get the help they need and failure rates in some of the introductory programming courses (TDT4100, TDT4120) are as high as 30% (1).

Peer review systems have been tried at universities before, systems where staff gives exercises and students review each other code and code style have been implemented and have shown some good results (2). Another study that found that students respond positively to peer review (3). However, they found that the correlation between the students reviews and the grading by the course staff was weak. Some of the same researcher state in a later paper that reviewing the reviews of students could help to ensure greater quality in the peer reviews (4).

My research aims to find out if peer evaluation can have an impact on the learning experience in courses as well as the impact on the course staff (Teachers, Teaching Assistants, and Student Assistants). Earlier research has shown that students respond positively to peer reviewing. In addition to the peer review system gamification elements will be added to the system in order to see if these kinds of elements help with student participation.

RQ1: How does a peer review system impact the learning experience?

RQ2: In what way does such a system impact the course staff?

Contributions

There have been earlier systems that do peer review of students in programming courses (2), (4). However, none of these incorporate gamification elements in order to try to increase student participation and satisfaction. Gamification has been shown to work, in a review of studies on gamification from 2014 (5), gamification is found to have an overall positive impact on the learning experience. A new computer-based peer review system for programming exercises that incorporates gamification elements will be created and reviewed.

Research Method

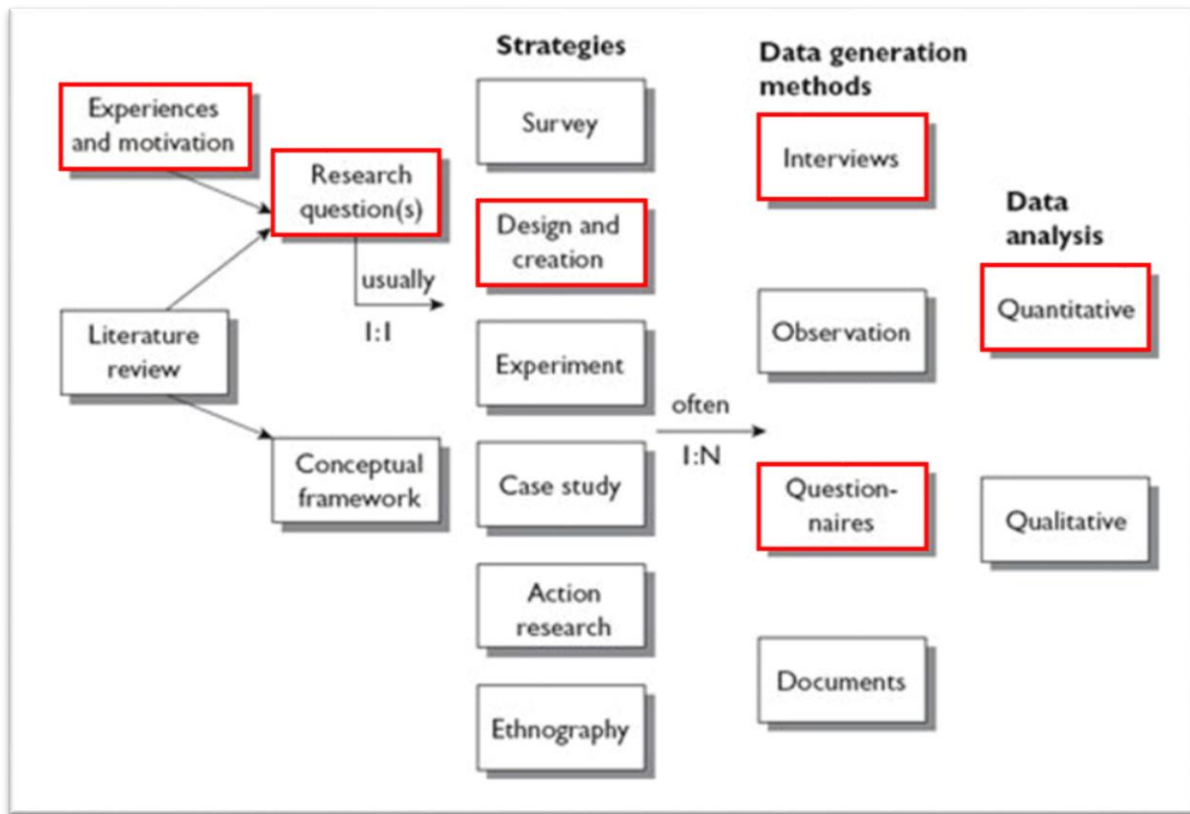


Figure 1: Research Process

The research will consist of the design and creation of a new computer system and the subsequent review of that system. The motivation comes from the staff at NTNU, they see problems with today's current system for exercises and want to evaluate alternatives and changes to the current system. The research questions tie directly into this need to see if the new system is an improvement over the old ones. Data generation will be in the form of interviews and questionnaires. I will interview some members of the course staff where the new system is used and send a questionnaire to the students that have used the system. This will give me a lot of data, overall understanding of student satisfaction for the questionnaire and a deeper understanding on the impact on the course staff from the interviews with the course staff.

Participants

As the researcher, I am a participant. I will develop the system and conduct the research. The supervisor for this research is Rune Sætre. Rune is contributing with experience in how the courses at NTNU work especially how exercises are created, distributed to students, and evaluated. He will also help with finding somewhere to test the system once it is developed, preferably in a real course at NTNU.

Other people included in the research will be students and course staff from courses that will test the system. These people will be interviewed and answer questionnaires. This data will serve as the basis for my data analysis. All data from the interviews and questionnaires are anonymous and will not be used for anything else than input for my data analysis. The data in the questionnaires will possibly

contain some sensitive information and legal or ethical aspects of this should be given to the students before they start using the system.

Research Paradigm

Design and creation is the chosen research strategy. This research is based on a new system developed and subsequently reviewed by the researcher. The review will be based on empirical data gathered from the users of the system. When doing the review in order to come to a conclusion for my research any belief or thoughts I have on the subject will be kept independent and will not affect the research, the research can therefore be said to be objective.

Final Deliverables and Dissemination

The final deliveries for this research will be a master thesis and source code for the developed system.

References

1. **NTNU**. NTNU Gradestatistics. [Online] NTNU. [Cited: May 8, 2016.] <https://sats.itea.ntnu.no/karstat/login.do>.
2. *Assessment of programming language learning based on peer code review model*. **Yanqing, Wang, et al.** 2, s.l. : Computers & Education, 2012, Vol. 59.
3. *Use of Peer-Review System for Enhancing Learning of Programming*. **Hämäläinen, Harri, et al.** Riga : IEEE, 2009. 978-0-7695-3711-5.
4. *MyPeerReview: An Online Peer-Reviewing System for Programming Courses*. **Hyyrynen, Ville, et al.** Koli : Koli Calling '10, 2010. 978-1-4503-0520-4.
5. *Does Gamification Work? — A Literature Review of Empirical Studies on Gamification*. **Hamari, Juho, Koivisto, Jonna and Sarsa, Harri.** Waikoloa : IEEE, 2014. 1530-1605.