

Work Life as an Inspiration for the MiRaMi Total Method for Motivational Learning Implementation for the First Year University Studies

Mira Grönvall and Rami Lehtinen
 Tampere University of Applied Sciences, Finland

Abstract

This article introduces and reports experiences about the MiRaMi total method, named after the authors, Mira Grönvall and Rami Lehtinen, which has been developed and implemented for the first year studies in Bachelor Degree Program of Business Information Systems in Tampere University of Applied Sciences with very promising results. Authors believe that especially the first year should be designed pedagogically so that the student will be orientated for the studies, they will be motivated to learn and they get a realistic understanding what the work life expectations are.

MiRaMi method combines various pedagogical elements. Student presence is essential and there is only one or two subject(s) or topic(s) for one day. Large four month work life simulation in small teams is the base for motivational learning. The students are given a mobile phone game development project assignment and it is implemented as in real work life, while learning at the same time.

As a result of a four years' experience it is discovered, that the student dropout has been decreased by more than 50% and the amount of annual applicants has been increased by 127%.

Authors believe that the method could be universally applied also into other fields of education.

1. Introduction

The first year university study curricula and its total implementation effects heavily on the student's experience of the degree program's quality and his or her decision to drop out or continue. Students often begin the studies in a new situation in life and that is why it is important to pay a attention how to fill in the students into university studies.

In autumn of the year 2010, the authors started to rethink the implementation of the first year university studies in the bachelor degree program of Business Information Systems (BIS) at the Tampere University of Applied Sciences (TAMK). At that moment, the

annual student dropout has many years been around 25 % during the first year in the program. The dropout was way too high considering that the students were selected to the degree program among huge amount of applicants with the entrance exam. The student's experience of the studies was also found to be unsatisfactory.

At that time, the school day of a student was fragmented between many different lessons of many different subjects, shown in figure 1, which all could be conducted with different teacher. Actually, this is the traditional way of curricula implementation in most of the schools and universities. Authors were not able to figure out any student oriented reasoning why the day fragmentation would be beneficial approach. Instead, the authors believe, that with the fragmented organizing approach it is very difficult to implement the student's day to form a logical and motivating completeness.

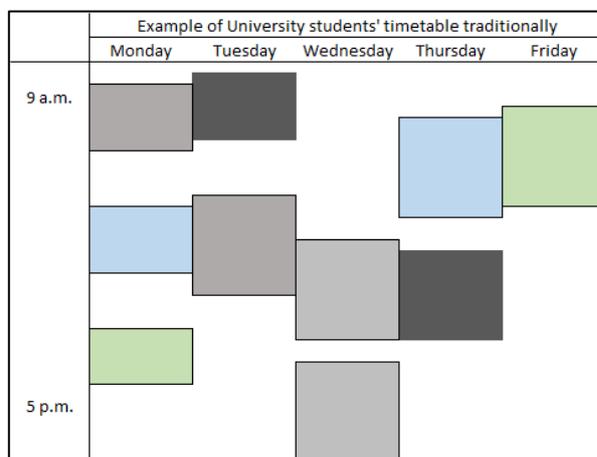


Figure 1. Example of traditional fragmented timetable of University student

Another demotivating factor is that traditionally the first year in universities is loaded mostly with theoretical background courses, such as mathematics, physics and chemistry, without good opportunities to apply them immediately in practice. Lectures and mass

lectures are often the educational methods and the students are moving from a classroom to another.

These factors demotivates too many good students, who would need concrete views where they need these theories. Is it possible to rethink the way first year university studies are designed?

In the MiRaMi learning method, the first year university studies are tried to design and implement in a motivating completeness including extensive product development project simulating work life. Today's work life requires especially for good team workers and project working abilities. The big picture in MiRaMi method is that already during the first year, the student would get realistic understanding what kind of profession he or she is studying for and what is waiting in the work life. The hypothesis is that after this experience, the student will be more motivated to study and learn also the deeper theory courses scheduled on the second and third year's curricula with improved learning results.

The objective of this paper is to introduce and report the implementation experiences about the MiRaMi method, named after the first names of the authors, Mira Grönvall and Rami Lehtinen. The method has been developed in 2010 – 2011 and has now been implemented during four years in TAMK BIS.

2. Background of the Finnish education system and the TAMK BIS

In Finland higher education is offered by the government, paid by tax payers and given for free for the students. Applying to high education is possible after upper secondary education with certificate and/or entrance exam, depending on the field and university. Higher education in Finland has a dual model, where universities offers bachelor's, master's, licentiate and doctoral degrees, and universities of applied sciences offers polytechnic bachelor's and polytechnic master's degrees. Polytechnic master's degree requires three years' work experience after the bachelor's degree. Polytechnic master's degree gives a right to continue to licentiate and doctoral studies in universities.

The Degree Program of Business Information Systems gives education for polytechnic bachelor's degrees. Degree is 210 credit units and it takes three and a half years. One credit unit counts for 27 hours of student's work. Intake for the degree program is 100 students per year and they are divided into five 20 students coaching groups for the first year studies. The aim is to train enterprising, collaborative and self-developing ICT professionals in close collaboration with the working life. Specializations are Game Production, Software Production, Network Services, Web-Services and ICT Entrepreneurship.

During the academic year 2010-2011 the degree program decided to go true an extensive curricula renewing. Before the actual curricula work, a detailed account of the work life needs for the future was made. BIS alumnus and work life representatives from the local companies on the ICT-field were all interviewed for the account. The report pointed the importance of different kind of work life skills in ICT-field, including project working and team work skills, because of the nature of the work.

The account put the work life skills on the spot. How the traditional higher education could take these skills better into account?

The authors were set to be responsible for the curricula for the first year studies, which makes a base for all the specializations. Other than develop the content of the courses, there was also need to improve the students' commitment for the studies. Student drop out during the first year studies was way too high about 25%. There was also a worry about the time the students used for the studies. Would it be possible to motivate the students to work harder but at the same time, make them feel comfortable and actually enjoy the studies?

3. Methods: Rethinking the first year of TAMK BIS

Authors figured, that when the students begin the university studies, they are typically around 20 years old, probably living by him- or herself for the first time, and maybe moved even to another city, far from the family and friends. It is very important to pay attention to the students experience in this situation. The authors asked themselves: What could be done differently in first year university studies? This reasoning combined the findings at the account made the authors completely rethink the first year studies and the MiRaMi total method for motivational learning in first year university studies was developed.

After combining all the thoughts, the authors identified eight key questions: 1) What if the students would be present at the school in every workday from 9 a.m. to 5 p.m.? 2) What if the students would have only one or maximum two subjects or topics for the whole day? 3) What if the learning is done more in teams? 4) What if the teachers are more like coaches? 5) What if all second semester courses would be integrated around a large product development project? 6) What if the project would be done in 4-5 people's development teams, just like in real working life? 7) What if the results of the project would be internationally published? 8) What if the semester would end in self-organized Game Expo and the feedback about the outcomes would be given by the representatives from the game industry?

Based on this development process, the authors completely rethought the first year studies from the clean table and the MiRaMi total method for motivational learning in first year university studies was born and taken into first time execution in the academic year 2011 – 2012.

4. MiRaMi Total Method for Motivational Learning

4.1. The main elements of the method

The MiRaMi method uniquely combines pedagogical elements of coaching [2,3], team learning [2], project learning [2,4], flow [1] and gamification [2]. Also the main principles, values and tools of the method are thought through and presented in Figure 2.

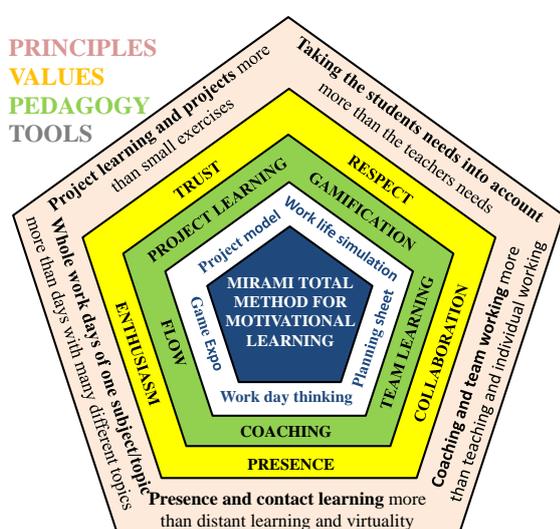


Figure 2. The principles, values, pedagogy and tools of the MiRaMi method

In the outer layer are the key principles of MiRaMi method which are also summarized in Table 1.

Table 1. Principles of MiRaMi method

Project learning and projects more than small exercises
Taking students' needs into account more than the teachers needs
Coaching and team work more than teaching and individual working
Presence and contact lessons more than distant learning and virtuality
Whole work days of one subject/topics more than days with many different topics

And as in agile manifesto, while there is value in the items on the right, in bold in table 1, we value the items on the left more.

Key values guiding the principles are 1) respect, 2) collaboration, 3) presence, 4) enthusiasm and 5) trust. And the used practical implementation tools are 1) work life simulation, 2) planning sheets, 3) work day thinking, 4) Game Expo and 5) Project Model, all explained later on this article. Most of all, MiRaMi is a method for practical and pedagogical implementation of the curricula, whereas the curricula itself does not vary much from the curricula on ICT-field generally. For example the second semester work life simulation, explained later on this paper in detailed, is a combination of eight separate courses, total of 30 credit units. Whereas, the key point in MiRaMi method is how the courses are all integrated to the one large project assignment and the practical work during the courses is targeted for the project. Maybe the most essential implementation element of the method is that the students are present at school every day from Monday to Friday on nine-to-five basis, just like in work life, and there is only one subject or topic for one day, or at maximum two subjects per day. And that this principle is a common frame to all teacher's for their individual pedagogical choices. This tool is called "work day and place" -thinking, illustrated in figure 3.

"WORKING DAY AND PLACE" -THINKING

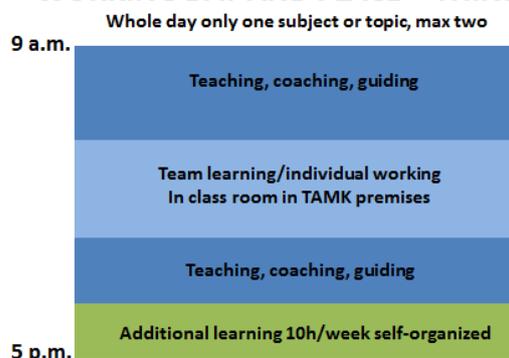


Figure 3. "Work day and place" -thinking

In the MiRaMi method, the school is simulating the work place for students. In an eight hour working day of the students, the teacher is physically present in average four hours. Teachers act more like coaches than teachers. In working day thinking, teacher will start the day in the morning, explaining the aim of the day and teaching and coaching the needed theory so that the aim of the day is possible to achieve. Teacher also gives the exercises for the day. In between, the students are doing themselves learning in teams, individually or whatsoever the teacher has instructed or the aim demands. Instead doing homework

	Week34	W35	W36	W37	W38	W39	W40	W41	W43	W44	W45	W46	W47	W48	W49	W50	W51		
MON		Basics of computer networks (6 cu)																	
TUE		Introduction to programming (6 cu)																	
		Office documents management (3 cu)								Databases (3 cu)									
WED	Oriental	Introduction to ICT and team work (6 cu)																	
		Case Web interface			Case Kodu			Case Robot				Case ICT-entepreneur				Case Security			
THU	Oriental	Computer logics (3 cu)								English (3 cu)									
FRI	Oriental	Office documents management (3 cu)								Databases (3 cu)									
		Introduction to programming (6 cu)																	

Figure 4. Planning sheet for the first semester

individually at home, now the students may help each other to achieve the aim. At the end of the day, in the afternoon, teacher returns back to the class and goes true how the students have been able to do the given exercises, and helps with questions and problems the students may have faced. Thus students get the feedback right away and at the end of the day there is a feeling of success.

In the MiRaMi method the courses lengths are planned in modular structure set to be 3, 6, 9, 12 or 15 credits only. Reason for this is, that in every four period the study load is 15 credits divided into five weekdays. For example 3 credits course reserves all Mondays of the period making altogether 8 working days. The study year consist of 60 credits and four 8 week periods.

Planning sheets, in figures 4 and 6, are tools to plan and built the time tables for the semesters and for the whole year on the day and week level. Planning sheet is also a tool for managing the resources needed in the total concept, such as courses, classrooms, teachers, timings and so on. Sheets are done for each semester separately. Figure 4 shows the sheet for the first semester. Implementation of first semester is explained next.

4.2. First semester gives abilities for the forthcoming project.

The first semester’s meaning is first of all welcome the students for the degree program and orient them for the high level education practices. Other than that, the main objective is to learn basic theoretical skills on information and communication technology (ICT). The courses for the first semester are Basics of Computer Networks, Introduction to Programming, Office Documents Management, Computer logics, English, Databases and Introduction to ICT and team work.

These courses give the basic theory needed, but also the background for the upcoming project. Even more importantly during the first semester students learn the team working skills. These skills are practiced during each course following the working day thinking and taking advantage of team learning into which students are coached for. Team work is not always easy for the often introverted students, so a lot of support and guidance is needed.

Coaching occurs in course Introduction to ICT Field and Team Work and the team working skills are put into practice in five different cases, three working days each, where the aim is to find a solution for different kind of problems. The cases are done in teams of 2-4 students and the teams are mixed to be different in each case in order to improve the team working skills of students and to get to along with different kind of team mates. The students are writing learning diaries in which they are reflecting themselves and their team’s work. The students are encouraged to try different roles in different cases and going out from their comfort zone. The coach is having private development discussion with each student and gives feedback to the diary.



Figure 4: Real learning situation in robot case

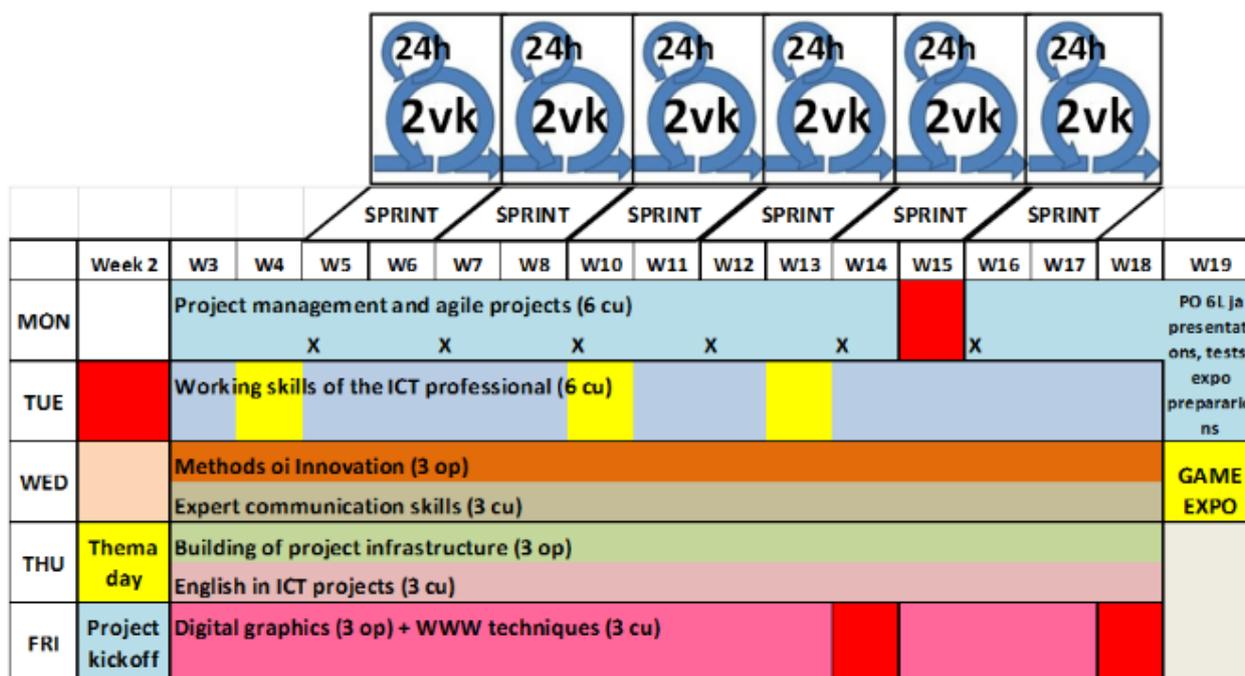


Figure 6. Planning sheet for the second semester work life simulation (All courses integrated around the mobile game development project)

Cases are ICT and degree program’s specialization related: 1) Game making with Kodu, 2) programming with Lego Mindstorm Robotics, 3) reasoning what ICT entrepreneurship is like, 4) familiarization with usability and 5) develop in information security.

It is not that the case assignments are very demanding, but instead the point is that no one is able to find the solution by him- or herself in the given time frame. In the degree program we also want to believe that learning can be fun, even in university level as seen in figure 5. By giving positive learning experiences and building up a positive team spirit, we make sure that the students are able to reach the discomfort zone later on the project and work hard for the common best. It is important, that there is no suggestions about project working yet. Before the students are able to do actual projects, and the projects are meant here in a very serious meaning, many skills are needed.

4.3. Work life simulation reaches for a flow

The second semester comprises of one large work life simulation around which all teaching, coaching and learning are integrated. All the courses, total of 30 credit units, are part of the large development project having a real assignee. All the courses and their teachers have their own orchestrated role, which is managed by the Responsibility Assignment Matrix (RACI) presented simplified in Table 2.

Table 2. Responsible Assignment Matrix (RACI) used by the team of teachers.

Project Management and Agile Projects	Takes care of all the project documentation and agile project methods. Project management teacher has a role as a product owner
Working Skills of the ICT Professional	In this course students mainly do the project work, coach has a role of manager and takes care of the routines such as development discussions.
Methods of Innovation	Runs true the innovation methods to help develop the game ideas and ideas for the trailer and Game Expo planning.
Expert Communication Skills	Repairs students for appear in public, communicate professionally, negotiate with the customer and so on.
Building of Project Infrastructure	Responsible for project infrastructure during the project, using cloud services.
English in ICT Projects	Rehearses to communicate in English, for example how to do game pitching. All the documentation and end products are done both Finnish and English.
Digital Graphics	

In response of graphics in both game and WWW-pages.

WWW-techniques

In response of techniques needed to create the website

It is important that the work life simulation repeats the elements recognized in real work life. As already mentioned, we have brought work day and work place thinking into school. Other than that, we try to implement project work as authentic as possible.

First of all, the assignment is given by a real life client, such as the city of Tampere (2015), Nokia Mobile Phones (2014) or UKK Institute for the Health Promotion Research (2016) as the latest. Students respects that the games are developed for a real need. That gives motivation to succeed. On the other hand the assignment gives boundaries for the project, as we have conditions in real work life. You have to take clients' needs into consideration. And it is done interactively with the client as well as with the end-users during the project implementation. The assignments have been so far games for either marketing or educational needs. In co-operation with city of Tampere the end-users, being students at the comprehensive schools in Tampere, participated as a test user during the project and that way valuable feedback guided the project development.

The used project management method, scrum, is also taken from real work life. Scrum is an agile software development methodology for managing different kind of product development, such as game development. It is a strategy where a development team, in our case teams of 4-5 students, works as a unit to reach a common goal, in this project a mobile game. It enables teams to self-organize by encouraging collaboration of all team members, as well as daily face-to-face communication among all team members and disciplines in the project. Development teams are formulated so, that coach first selects the scrum masters from the applicants. Then the scrum masters have a meeting and they negotiate as long as they have teams formulated. Coach, as the Human Resources (HR) manager, has a right to do changes, if needed. Idea is to get teams, were the members completes each.

In addition of teaching the agile project management principles to the students, the project management teacher is in the role of product owner and represents the client to teams. Each development team's ScrumMaster takes care that the team will follow the agile methods routines during the project. The project routines come directly from the scrum method. Project is divided for six two weeks sprint. Daily meetings are held every morning before the class begins. As in scrum, the product backlog items are

planned for each sprint and after the sprint, team has a retrospective.

The documentation is also typical for the project management. In agile methods the documentation is lesser than in traditional project management. In our case, the needed project management documents are project plan, working time account sheet, product backlog, sprint backlog, impediment list, burn down chart and closing report. The project plan and the closing report are made both in Finnish and in English, and marked by both project management teacher and language teachers. Teachers put together the responsibilities of each course to responsible assignment (RACI) matrix. RACI matrix is used to clarify the roles and responsibilities of each course integrated to this project completeness.

The assignment is one of written documents. It is written by the project management teachers' together with the client. It describes the context, the aim, organizing and execution of the project.

In the spring 2015 the client was Basic Education of City of Tampere. The assignment was given in Table 3.

The leading idea in the MiRaMi method during the second semester working life simulation is that the students are highly appreciated, believed and taken as real workers, even though they are first year students.

They are given quite a challenge, but not left alone. They have support from the team of teachers of the integrated courses. They have a contact for the client from the very beginning, when the project begins with a kick off –day. During the day the client presents the assignment, which is always a big secret until the kick off- day. After the assignment is announced, the program continues all day, including key note speakers. Students are given a feeling, that the project is a serious business, not just a typical project work for a teacher with no actual meaning, other than learning itself. During the simulation, the students' excitement is almost tangible.

When the project is done, after four months including six times two weeks sprints, it is time to show the outcome to the world. Publishing the outcomes makes students to work even harder. Games are published internationally in mobile stores, such as Google Play Store, depending of the used platform. Not often the school assignment product is used by thousands of users.

The other part of the publicity is the game fair, which is self-organized by the students. This event started from small and it has grown year by year, and the Game Fair 2015 was held in Tampere Hall, which is Scandinavia's largest congress and concert centre. During the day there was about 5000 visitors. Audience votes for the best game and a jury, collected from the famed game development companies'

representatives, chooses their favorite game. When respected experts from the game houses give their feedback wondering the amazing high pitch of the games, it makes a wonder for the students' confidence. And the students will have their real reference for their portfolio.

After the Game Fair it is time to finalize the project with celebration, which in Finland typically is a sauna get together. It is wonderful, how the students, teachers and Game Fair jury members spend cheerfully a night together, discussing about the project and how it is finally successfully over. There is no better way to send the students for a summer holidays.

5. Achievements

There is now four years practical experience of the MiRaMi method during which period the amount of student dropout has been decreased by more than 50 %, which means, that the set aim of the renewing work has been reached. At the time the amount of annual applicants of the degree program has been increased by 127 %.

Table 3. The assignment of the year 2015 in a form that it was given to the students in project kickoff in January 2015

PROJECT ASSIGNMENT	
<p>CONTEXT OF THE PROJECT</p> <p>Studying mathematical sciences (mathematics, physics and chemistry) in secondary school, at age of 13-16, do not motivate all the students, and on the other hand, part of the students are particularly interested and motivated. That is a challenge for the teachers. Vega Maths Publishing House is the publisher of textbooks and digital materials, and wants to explore and develop new kinds of learning approaches to those substances.</p> <p>Vega Maths has ordered XGames Ltd project, during which it is intended to develop learning games for mathematical sciences to motivate and promote to learn. The mobile game and material to support the game themes will be presented in an interesting and inspiring website.</p> <p>The partner of XGames Ltd is the Tampere basic education, in order to test and use the content and offer a wide range of mathematical and educational expertise to be used in the project. Other partners are possible.</p>	
<p>AIM OF THE PROJECT</p> <p>During the project, brainstorming and implementing of the game as well as the inspirational website is done in collaboration with the Product Owner. The game is Android mobile game and is published in the Google Play Store and available for free. The aim is to create a game that is suitable for learning mathematical sciences in upper level comprehensive schools.</p> <p>Common portal brings together all games and websites done in the project. From the portal user can make choices, for example, by subject or by class. The demand is that the login to the portal is with username, in which case it is possible for example to save scores for the game. Detailed specifications about the features are made with the product owner and the partners.</p> <p>Games and websites are available at the international market. Level of study material has been selected by the Finnish upper level comprehensives schools' curricula. Level of the content of these mobile games and websites must suite this curricula. To market the game an English Trailer is made. Games and websites are made both in Finnish and English languages. Other language options can be involved in the implementation, if wanted. The game must be able to be played with an Android tablets or with PC's.</p> <p>The website and the portal will operate on PC's and on the Android tablets, but also with Android mobile devices.</p> <p>Development teams must get approval for acceptable game-ideas from the client's representative. Development teams gets feedback from the client's representative, if needed, to add to the game features, content and structure of web pages, etc. The product owner and the client's representative selects in co-operation the game idea at the beginning from the three rough ideas. Each development team implements a single game.</p>	

ORGANIZING THE PROJECT

1. The project establishes a 4-5 person development teams, with game development related know-how and with capacity for innovation.
2. One of the team member operates in a ScrumMasters role.
3. Two team members specializes to mobile game programming.
4. Teams are formed from the students of each coaching group by ScrumMasters under the coaches supervising. Coaches operate as the project team managers.
5. The project works are ordered by Vega Maths, and the project management teachers, as in Product Owners role, ensures the benefits of the XGames Ltd.
6. Expert help is given for the development teams. These experts are:
Innovation Competence teachers
Programming teacher
Graphics teachers
WWW-technique teachers
Project Infra teachers
English language teachers
Finnish teachers
Two trainees
Head coach coordinates the completeness of the project.

EXECUTION OF THE PROJECT

In this project

Agile project management and software development methods are used.

Used instruments, softwares and tools are defined by TAMK.

Development teams works at the school daily from 9 p.m. to 5 p.m.

Each development team brainstorms and implements a website, a mobile game and a game trailer.

The common portal design and implementation is carried out in co-operation among persons elected from each coaching group, assisted by trainees.

Project management teachers have the Product Owners' role.

ScrumMaster is selected from the coaching group and named for each development team.

The project assignment is announced at calendar week 2.

The project (game, website, game trailer and project documentation, as well as web sites to compile a portal) is carried out in six 2-week sprints during calendar weeks 5-18.

The game trailer is ready after sprint 5.

Games are presented before the Game Expo by publishing the trailers in Facebook.

Completed projects' end products are published in Wednesday calendar week 19 at the Game Expo held in Tampere Hall.

The results of the sprints are presented for the product owner and the precise content of the sprints are planned in co-operation with the product owner and the specialists.

Development team and ScrumMaster plans and has effective meetings.

Also, the learning objectives of each course are recorded in the sprint backlog.

Workloads and personal development are reported daily to the appointed administrative system in accordance with the instructions given by the manager and the ScrumMaster, to be in use of the development team and the superiors. Supervisors prepare teams to use the proper procedure.

Development teams, represented by the chair of the each coaching group, and experts, represented by the head coach and the head of the degree program, makes a steering group of the project and gets together every other week.

In the spring 2015, all the 21 development teams finished their projects successfully on time and the 21 free-to-play mobile phone games published in Google Play Store and Internet portal [6]. Student feedback for the first year studies has also been very positive, as well as the feedback from the companies we have worked with.

The successful co-operation with city of Tampere and the magnificent outcome made a front page news in local morning paper and reporters from local radio stations broadcasted interviews from the Game Expo.

6. Discussion

The first year of university studies is of key importance in many ways and at present too many students stop their studies during the first year due to poor student experience. Authors believe, the reason lies to some extent in the traditional way of university study implementation: 1) the fragmentation of the students day between many different subject and tasks without any connection to each other and 2) the heavy load of theoretical background courses (like mathematics, physics and chemistry) in the first year without applying them into the practice.

The MiRaMi method is a method that differs from those traditions and with very promising results. As the hard measures, after implementing the method, the dropout has been halved indicating improved student experience. Furthermore, the amount of applicants has more than doubled from its first implementation. The best outcome has been students' feedback and on the other hand the observed mental growth of students during the first year studies. Feedback from the companies has been glowing and it is each year easier to find an excellent partner to co-operation.

Must say that it has been surprising how innovative and creative the students can be in their solutions and how the outcomes have been beyond all expectations each year. First year students should never be underestimated, they should be trusted and encouraged, because when you reach flow, only the heaven is the limit.

However, the change has not been only easy, since it has required some change from all the teachers too. The autonomy of the teacher to plan and execute his or her own teaching course has traditionally been very high, at least in Finland, and based on that teachers are used to plan and organize their teaching as they like and are used to work very much alone. In Finland, the teachers are well educated, skillful and respected. However, now within the MiRaMi method implementation "the work day thinking" principle requires the teacher to take a whole day or at minimum a half a day in his or her course responsibility and

handle that pedagogically making it meaningful to the students so that the students are present in school. It doesn't sound too difficult for skillful teachers, but it is a very different situation than planning just a one or two hours contact session and after that giving some home works to the student. Instead now when the teacher need to plan the morning part, the students midday working session and the afternoon, the teacher will get more in interaction with the students and will get instant feedback face-to-face from the students at the end of the day. Some teachers have liked that from the very beginning, are fascinated about the new method and see it as an improvement. Most of the teachers have handled that well without any complains. But there are some teachers having problems with the approach and feel that their autonomy is too much limited with the method. And of course there are differences between different teaching subjects. Also same type of resistance was met with respect of second semester's work life simulation, because it needs team work from the teachers. As an experience, it is important to recognize this group of teachers too and their discomfort and understand their resistance as a normal change management issue and help and educate these teachers to handle this issue. This was the main reason why the half days were also introduced as an option for the teachers.

In conclusion, the entire renewing work has been a wonderful experience for the authors, familiarization all over again to learning and motivation, get motivated ourselves to teaching and become enthusiastic about the meaning of first year studies in universities.

The authors believe that there is a need to rethink the first year university studies and especially their implementation in all universities. Instead of being just a collection of courses, studies should form an inspiring student experience or a complete learning story, for every complete day and for the whole year. Teacher's role is not only to take care of his or her own course, but also take into account the completeness obeying common agreed frame rules as member of teachers' team. The presence, interactivity and team working are essential, both for students and teachers.

The MiRaMi total method for motivational learning is an attempt to that direction with very encouraging experiences and promising results. It warrants for scientific research with respect of learning results as well as student and teacher's experiences. Authors believe that the MiRaMi method could be universally applied in high level education education, especially in ICT related degree programs. By now, the MiRaMi method has been implemented in practice for four years. By the experience, the authors have a reason to believe that they really have found the key elements for a motivational learning.

7. Acknowledgements

The authors wish to thank all the teachers, students and other persons in Tampere University of Applied Sciences who have actively participated in the development of the first year studies of the Degree Program of the Business Information Systems, for their valuable contribution.

8. References

[1] M. Csikszentmihalyi, *Applications of Flow in Human Development and Education: The Collected Works of Mihaly Csikszentmihalyi*, Springer, Dordrecht, 2014.

[2] B. Barron and L. Darling-Hammond, *Teaching for Meaningful Learning: A Review of Research on Inquiry-Based and Cooperative Learning*, San Francisco CA, Jossey-Bass, 2008.

[3] D.W. Johnson and R.T. Johnson, "Making Cooperative Learning Work" in *Theory into Practice, Building Community through Cooperative Learning*, Taylor et Francis Ltd, 1999, pp. 67-73.

[4] P.C. Blumenfeld, E. Soloway, R.W. Marx et al, "Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning", *Educational Psychologist*, 1991, pp 369-398.

[5] Internet: <http://agilemanifesto.org/>. Manifesto for Agile Software Development.

[6] Internet: www.14tiko.projects.tamk.fi/en.html. The 21 freeware android mobile phone learning games for science subjects learning in secondary schools. Tampere University of Applied Sciences, Tampere Finland, 2015.