

10 ICLEI 2018-009 Mustonen Lea

Community Spirit as a Way for Better Results in Teaching Engineering Students

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ABSTRACT

The purpose of this article is to present an example of how to increase the community spirit, positive atmosphere and motivation in electrical- and automation engineering studies. The vision of Häme University of Applied Sciences (HAMK) is to offer the most inspiring higher education and the most customer-oriented applications of research. The students are a central part in all activities. HAMK's electrical- and automation engineering study programme is actively searching for ways to increase community spirit of students. The dropout percentage of technical students in Finland is high. The number of graduates and study credit accumulation affect the financing of universities. HAMK's quality system is based on continuous improvement. Central part of this system is the feedback collected from students at the end of each module. The feedback consists of 13 questions and 3 of them focus on the subject of this article: 1. I have received enough guidance and support for achieving the learning outcomes, 2. The atmosphere of my study group is supportive of learning, 3. The module affected my motivation and commitment to study. The findings are encouraging. The methods that have been used are for example: project-based learning, working life-oriented learning, team work and development of meta skills. The students start their studies with a practical project to raise their motivation and commitment for their studies. A personal study plan is made for every student. Advancement of the plan and possible changes are reviewed annually in development discussions. The conclusion: line of development shows that pedagogical means can improve the communality of students and motivation. At the same time the monitored performance indicators are showing a positive development in number of graduates and in credit accumulation of students. Good results have already been achieved but the development work continues.

Keywords: Community spirit, team teaching, quality system, degree of electricity and automation

Introduction

The purpose of this article is to present an example of how to increase the community spirit, positive atmosphere and motivation in electrical- and automation engineering studies. The goal is to find out a change in student feedback made according to quality assurance system that are directly related to changes made to improve community spirit. The target of observation is Häme University of Applied Sciences (HAMK) Electrical and automation engineering study programme.

Theoretical Framework

Universities in Finland offer Bachelor's and Master's degrees and academic, artistic and third-cycle postgraduate degrees. Universities of applied sciences – as Häme University of Applied Sciences (HAMK) - provide Bachelor's and Master's degrees (Figure 1). Universities and Universities of applied sciences in Finland are independent individuals that carry out

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education and research. Universities don't have a tuition for EU and EEA students. Students outside EU and EEA have tuition since autumn 2016. (Finnish National Agency for Education n.d.)

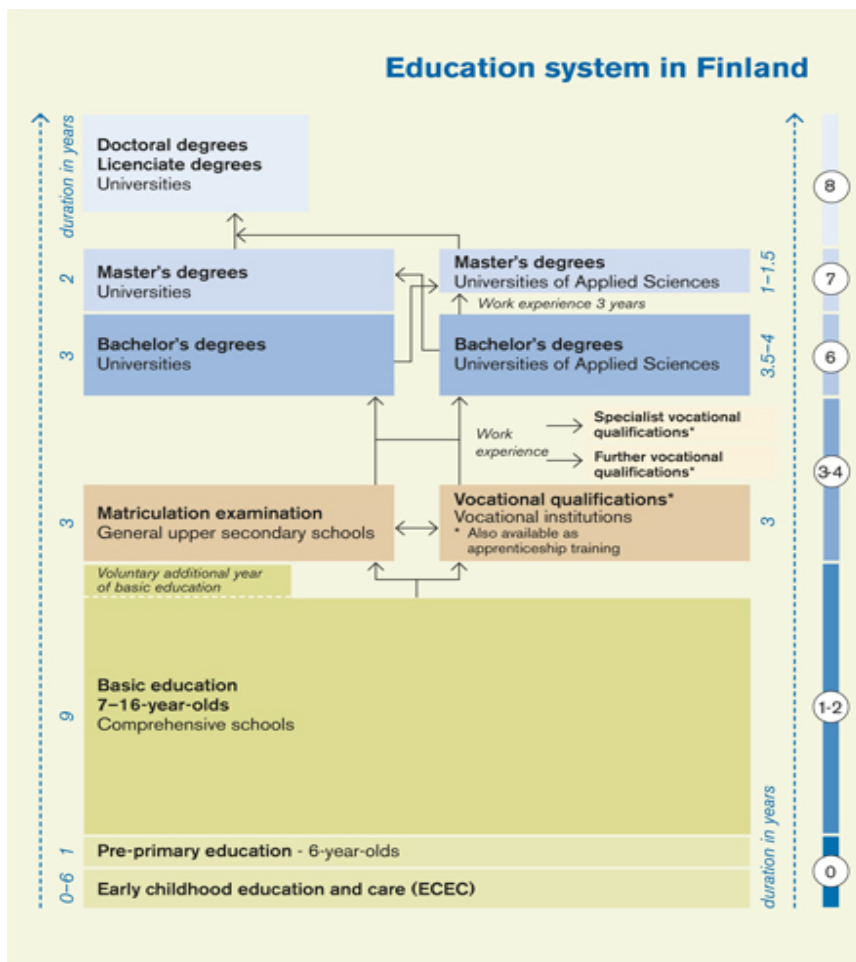


Figure 1. Education system of Finland (Finnish National Agency for Education n.d.).

Häme University of Applied Sciences (HAMK) is situated centrally in the most populated area of the country, southern Finland. HAMK has 7 campuses with around 7000 students about 600 teachers and other staff members, 31 degree programmes, of which 5 are delivered entirely in English. Education has been organized to five units and research to four units. The School of Technology provides engineering studies and research and product development services. The school has the following degree programmes:

- Construction and Civil Engineering
- Construction Engineering (in English)
- Construction Management
- Electrical and Automation Engineering (in English)
- Electrotechnology and Automation Engineering
- Information and Communication Technology
- Mechanical Engineering
- Mechanical Engineering and Production Technology (in English)
- Traffic and Transport Management
- Strategic Leading of Technology-based Business (Master-level)

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The vision of HAMK is to offer the most inspiring higher education and the most customer-oriented applications of research. The students are a central part in all activities. (HAMK n.d.)

HAMK's quality system is based on continuous improvement. The quality system has been evaluated to be advanced by national and global auditing. HAMK quality management is carried out in accordance with the continuous development cycle model, PDCA model: Plan, Do, Check, Act (Figure 2). It comprehends all operations and organizational levels, including students. (HAMK n.d.)

Central part of this system is the feedback collected from students at the end of each module. This data has been collected since the start of the electrical and automation engineering studies -programme.

Methodology and Literature

HAMK's electrical- and automation engineering study programme is actively searching for ways to increase community spirit of students.

Project-based Learning

The changes in working life require electrical and automation engineers have skills to participate in project works. Experts of a certain field in working life no longer work alone. Essential part of work now is the collaboration of the team and successful completion of the project and not the success of an individual. The readiness for this type of activity is to be established already during the studies.

At the start of each student group, they have a small-scale project that helps the student group to establish a good community spirit and the basics of project type working. At the same time, they learn about communication skills needed in working life. The students' practical project also raises their motivation and commitment for their studies.



Figure 2. Key quality management procedures and documents (HAMK n.d.).

Belbin Test

Every student completes the Belbin test under the guidance of a teacher. Belbin test is subdivided into 7 groups of each 8 statements. The students assess which of the claims in the test match them the best. Based on the results the students can be divided to nine different roles that enable them to form teams that are efficient and function well. (Belbin n.d.)

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After the definition of the roles, we can see the strengths and weaknesses of the team members. The result is used to improve the functioning of the team. The students recognize their strengths and weaknesses and reflect, and analyse the results. Based on the result the students have a better understanding of the team members behaviour patterns so it is easier for them to improve the team's functionality and team spirit. (Watkins & Gibson-Sweet, 1997, p. 105)

Personal Study Plan

A personal study plan is made for every student. The plan is made at the start of the studies and it is updated annually and according to need. The study plan is based on the national study plan. Every student must complete certain basic studies, but they can choose courses based on their orientation. Usually students choose 30 credits out of the 240 credits freely, but if the student really wants to specialize in a certain field, it is possible to choose studies up to 60 credits. It is also possible to tailor the studies based on working life. It is often used when the student already works in demanding expert knowledge related work.

Advancement of the plan and possible changes are reviewed annually in development discussions. Development discussions are events where the student and the teacher tutor review the status and progress of studies. These events are the situations where the student and the teacher can discuss possible matters or a specific situation that impede or create challenges to the motivation to study. The student and the teacher then try to find solutions to these matters together. The discussion is confidential between them but with mutual agreement, more people can be brought in to the discussion.

Teacher tutor refers to a person that is a member of the teaching staff. The teacher always has the responsibility of the starting group the student belongs to and follows their study advancement. One teacher tutor is usually responsible for one to two student groups with one student group consisting of roughly 30 students. Naturally, the whole teacher staff has some responsibility about student's advancement of studies.

The president and the vice presidents of HAMK also receives feedback and instructs the actions on a general level. Principals hearing is organized annually where the representatives of the student groups have a chance to discuss matters relating to studies. A memo is made based on the hearing feedback from the students with suggestions on the course of action and the memo is public for all the students and staff.

Internship and Final Thesis

The possibility to modify engineering studies based on the student's own ambition and strengths is a central part of raising the motivation to study. Still the most important part of the motivation comes from work training and bachelor's thesis that are part of engineering studies.

Electrical and automation engineering's work training consists of 30 credits. The thesis, 15 credits, is produced to serve the needs of the labor market. Usually it is a development task, product development, applied research or project work. The thesis is designed to be a bridge between studies and the world of work. The thesis is a comprehensive design, research or product development work that the student makes independently and takes advantage of the central area of expertise provided by studies. The thesis is often conducted in a technology firm. A thesis is produced to serve the needs of the labor market. It is important that the thesis is useful for the labor market and regional development.

It is common that the student finds employment in the firm he/she made the thesis or had his/her work training in. The students are therefore encouraged to find their work-training places and make their thesis on subject that holds interest for them. This benefits their career and at the same time helps them to build up their professional identity.

Team Teaching

The teaching model based on the university's strategy highlights the co-operation of teaching staff. Therefore, team teaching has settled its place as a part of teaching in HAMK. The model is used internationally and it has been researched.

Guan Huisheng and Gao Qingsong describe it as innovative teaching model which provide useful method for guidance and student-teacher communication. It focuses on learning more than teaching and challenges the teachers to co-operate between themselves and the students. The main purpose is to focus on improving abilities: "the students' learning ability, practical ability, innovation ability and thinking ability." (Huisheng & Qingsong, 2013, pp. 33 – 41)

Team teaching can be seen as a way to teach students critical thinking. In the model, the teaching staff need to work as a team and need to be in an open dialog with themselves and with the students. This makes the students able to see how to present questions, be critical and even have a different opinion while being constructive while having no need to strive to embarrass each other. (Brookfield, 2015, p. 246)

On the other hand, the model can be seen as pathway to teacher's development. The teachers can reflect their practices with each other. When the main theme or subject matter is the same for all of them, they can learn new aspects of it. They are also able to learn different ways of planning the course, teaching it, and evaluating the outcome. This all can happen only if the teachers can truly trust to each other and there is a high-level respect between them. (Liebel, Burden & Heldal, 2017, pp. 62 – 75)

Common value basis and pedagogical vision are important for success of team teaching. The roles also need to be clear and equal. For example, a young teacher may unconsciously pull back in his/her contribution when the team has a more experienced teacher in it. The team may also develop an internal strife for leadership that does not to create a positive result in students learning. Teachers in the teaching team need to get familiar with each other before engaging in shared teaching and if possible, the teams should be with the personalities of the teachers in mind. The possible problems most often rise from the lack of mutual respect between the teachers. On the other hand, teachers working well among themselves raises their creativity and professional growth. The students benefit from the teaching teams different opinions and the increase in the quality of teaching. (Stewart & Perry, 2005, pp. 1 – 14.)

Team Learning

The teaching staff's collaboration is highlighted in HAMK's strategy. However, the student's internal collaboration in their teams is also important. Teams have an important part in studying. Good community spirit helps greatly with the commitment to studies. The team learns from each other and keeps up the motivation for each other. A working team offers peer support at different stages of studies. (Kangastie et al., 2017, p. 15)

Survey and Findings

The HAMK Module system feedback consists of 13 questions and 3 of them focus on the subject of this article: 1. I have received enough guidance and support for achieving the learning outcomes, 2. The atmosphere of my study group is supportive of learning, 3. The module affected my motivation and commitment to study.

These questions were chosen because they are related to the changes made to increase community spirit within student groups. These kinds of questions were not part of the feedback queries made before moving to module-based teaching. The feedback has been collected from ten modules from years 2016 and 2017.

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Results of the Feedback

The first review question concerns guidance and support. Students work in teams for a great amount of their studies. The studies are also often based on independent research and on reflecting on the research within the group.

After the implementation of module-based learning, the role of the teachers has shifted from the traditional role to more of a coaching role where teachers rather encourage the students and guide them to sources of information. As seen in the figure 3, most of the students feel they have received enough guidance to achieve learning outcomes they want. When transitioning to a new way of operating, the reactions of the students were though as one of the biggest risks.

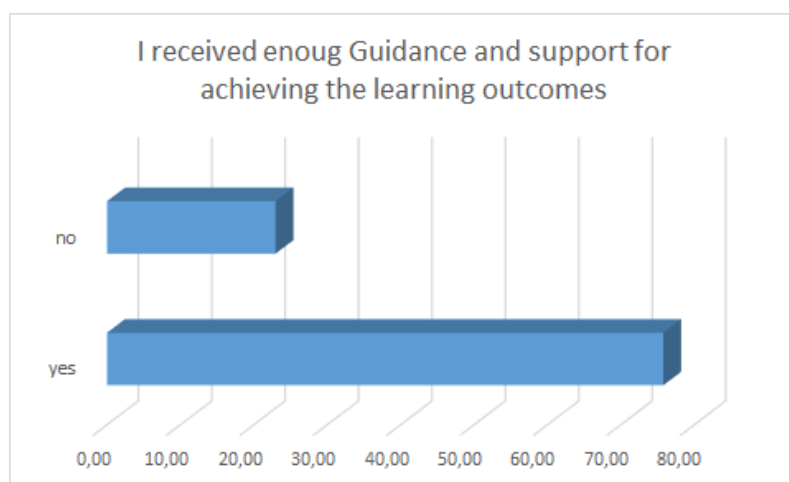


Figure 3. Guidance and support

Subject of the second question chosen for review was the study atmosphere and how it affects studying. Almost without an exception, the atmosphere had a positive impact on studies. (Figure 4).

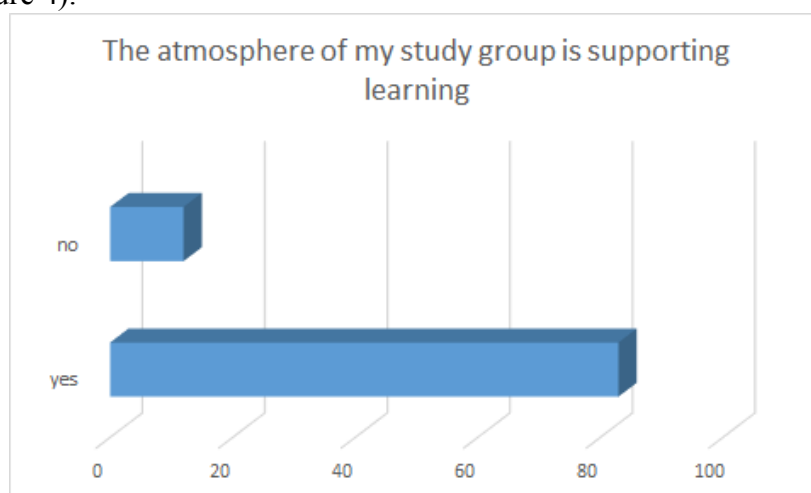


Figure 4. The atmosphere of the study group

The student groups' good community spirit has a significant impact on the progress of studies. In the conversations between students and their teacher tutors, the students have stated how good community spirit helps to keep on even when facing difficulties in studies. Exchanging of materials, encouraging and peer learning are considered as motivating for studying.

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The third question focuses on how studying in module affected the student's motivation and commitment to studies. As seen in figure 5 the results are encouraging.

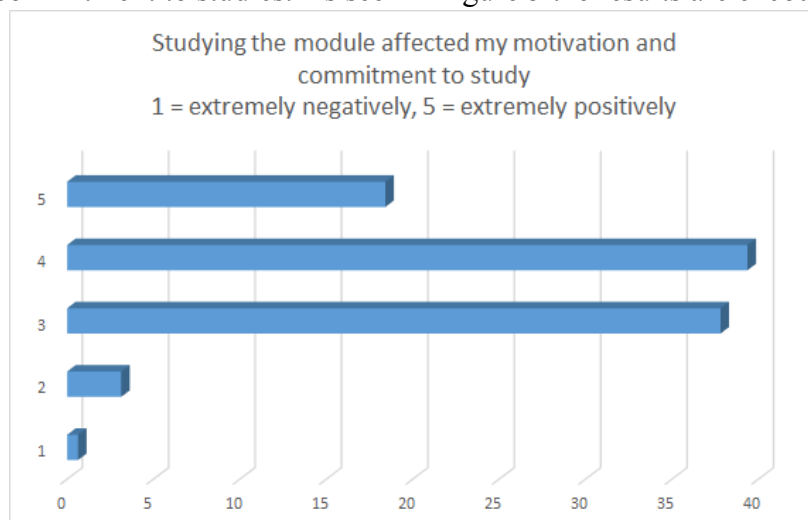


Figure 5. Motivation and commitment

From previous studies, every student has a comparison base for a different kind of studying. Specially some of the students from abroad have been accustomed to a different type of learning. Almost all students have thought module-based learning as a better option after a little bit of time.

Conclusion

The guide-lining question to this article is to ask if it is possible to increase the community spirit, positive atmosphere and motivation in electrical- and automation engineering studies. The effects of study atmosphere on learning outcomes has been a topic of discussion for a long time. What are the means to increase the motivation and learning outcomes of students? This article reviews the so called softer values. The objective has been to clarify how to promote good community spirit and how does it show itself in student feedback.

Before making any conclusions, it needs to be mentioned that this article contains only those module feedbacks the writers have been involved. A broader review would give a more reliable picture. It would also be good to make a similar type of review later to get some trending information. It must also be mentioned that there is no single factor that can be named for the cause of development. The result is a collection of multiple development measures.

The significance of this study is that, based on the results, we can encourage the testing and implementation of team teaching and similar types of pedagogical means. When implementing new methods, the risks affiliated with implementing new method just must be accepted. This affects both teachers and students. When education is implemented in a different way than before, there will be uncertainty and it is highly recommended to discuss with students about it. As Brookfield (2005, p. 246) said it is possible - and important - that the teaching staff and students can work as a team, and the students can become an active part that influences the success of implementation and the future development.

The measures taken to rise the community spirit of students require deep cooperation from the teaching staff. Basics are made by teaching staffs mutual intent where they create an atmosphere that supports community creation on three levels: between students, between staff and lastly between students and staff.

This study can contribute to the academic world the importance to notice that communality is possible to create and promote pedagogically and that it can be seen in results.

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Good results have already been achieved in HAMK's electrical- and automation engineering study programme but the development work continues.

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