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INCREASING THE PASSING RATE IN HAMK'S ELECTRICAL AND AUTOMATION STUDIES

Abstract:

The purpose of this article is to present how the accumulation of credits has developed over the last ten years in Häme University of Applied Sciences Electrical and Automation Engineering study programme.
Degree programme in Electrical and Automation Engineering has managed successfully to almost double the number of students able to gain over 55 credits in a year over the period of ten years. This good development springs from systematic monitoring, student caring culture and innovative teaching and learning methods. These are based on healthy and self-imposed working environment. Progression of studies can be encouraged with resolute work. The credit gain changes described in this article are not an accumulation of coincidences. Accumulation of credits is one of the defining factors of financing in the effectiveness gauge, but long-term and effective results are only possible if there are invests towards quality. Continuous development as described by the quality system is highlighted specially during the alteration progress.

Keywords:

Higher education system, pedagogy, promotion of studies, team teaching, quality management, work satisfaction

JEL Classification: I23, I28, I29

1 Introduction

The vision of Häme University of Applied Sciences (later: 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 improve learning results and accumulation of credits. Functions are guided by audited quality system.

One of the important parts of measuring effectiveness of the universities in Finland is how many of the students accumulate 55 credits during year.

The purpose of this article is to present how the accumulation of credits has developed during then years in the Häme University of Applied Sciences Electrical and Automation Engineering study programme. This article explains what methods have been used to increase effectiveness and evaluates them.

The main question is; what measures have been taken by HAMK Electrical and Eutomation Engineering study programme to achieve better results?

2 Theoretical framework

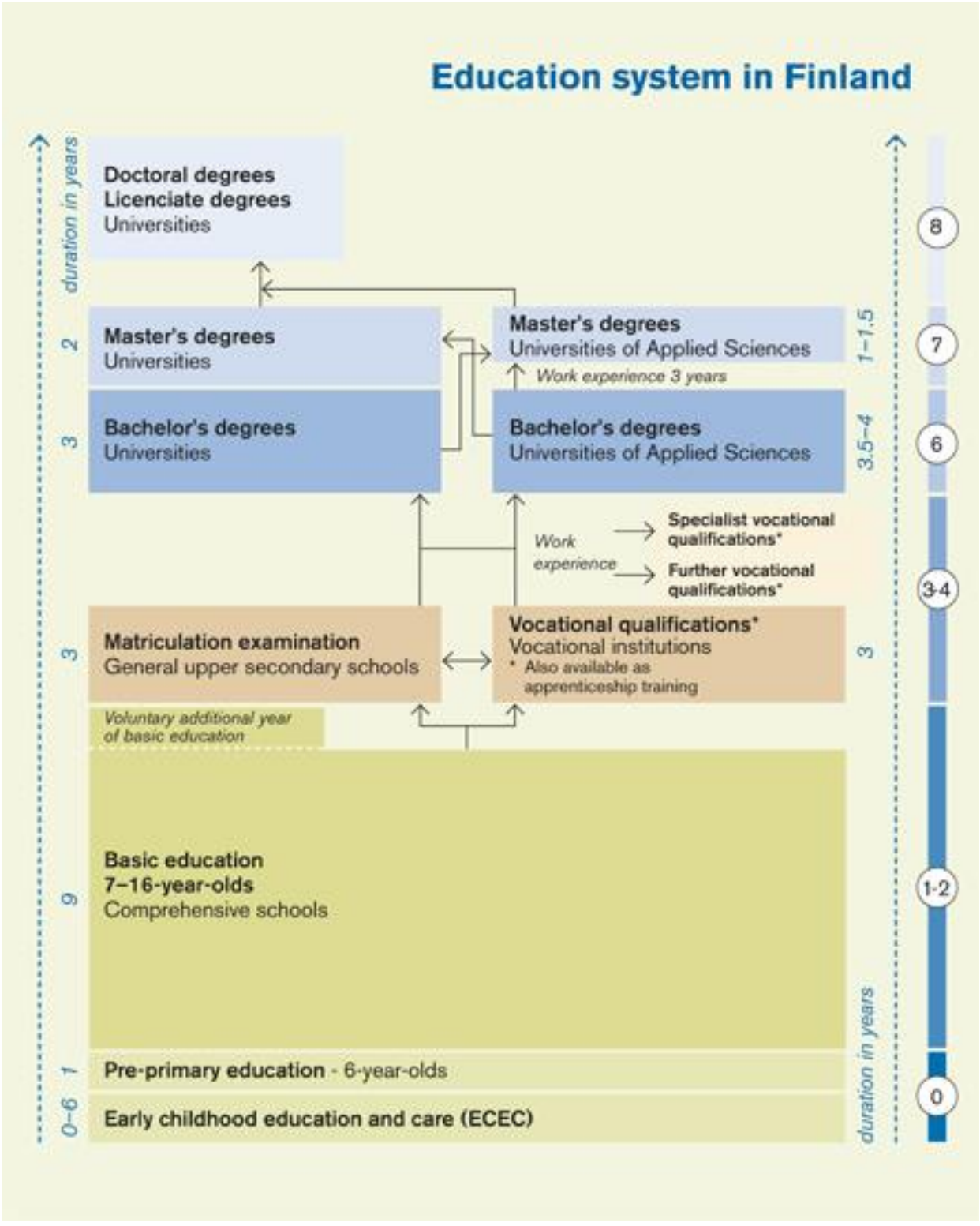
2.1 Education system of Finland

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 education and research. Universities do not 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.)

Research and teaching in universities of applied sciences are based on learning of practical skills and application of those skills. The need of the working life is the basis. (Ministy of Education and Culture (n.d.) Bachelor’s and Master's degrees can be studied in Universities of applied sciences. (Ammattikorkeakoululaki 14.11.2014/932)

Figure 1: Education system in Finland



Source: Finnish National Agency for Education n.d.

2.2 HAMK

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)

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 (Häme University of Applied sciences) strategy was implemented in 2013. One of the main changes was the group-oriented working of teachers. "Willpower, competence and leadership are essential to achieve the set aims. The work is well led, the competence of the staff is ensured, and everyone takes responsibility for their own work. We put emphasis on joint operating methods." (HAMK Strategy 2020.) The last sentence guides – and obliges – the staff to the very active teamwork.

At the same time HAMK moved from isolated study modules to a larger study module. The modules consist of 15 credits and includes multiple singular study modules (From now on referred to as "module"). In modules a certain area of interest is observed from various points of view.

2.3 The Quality system of universities

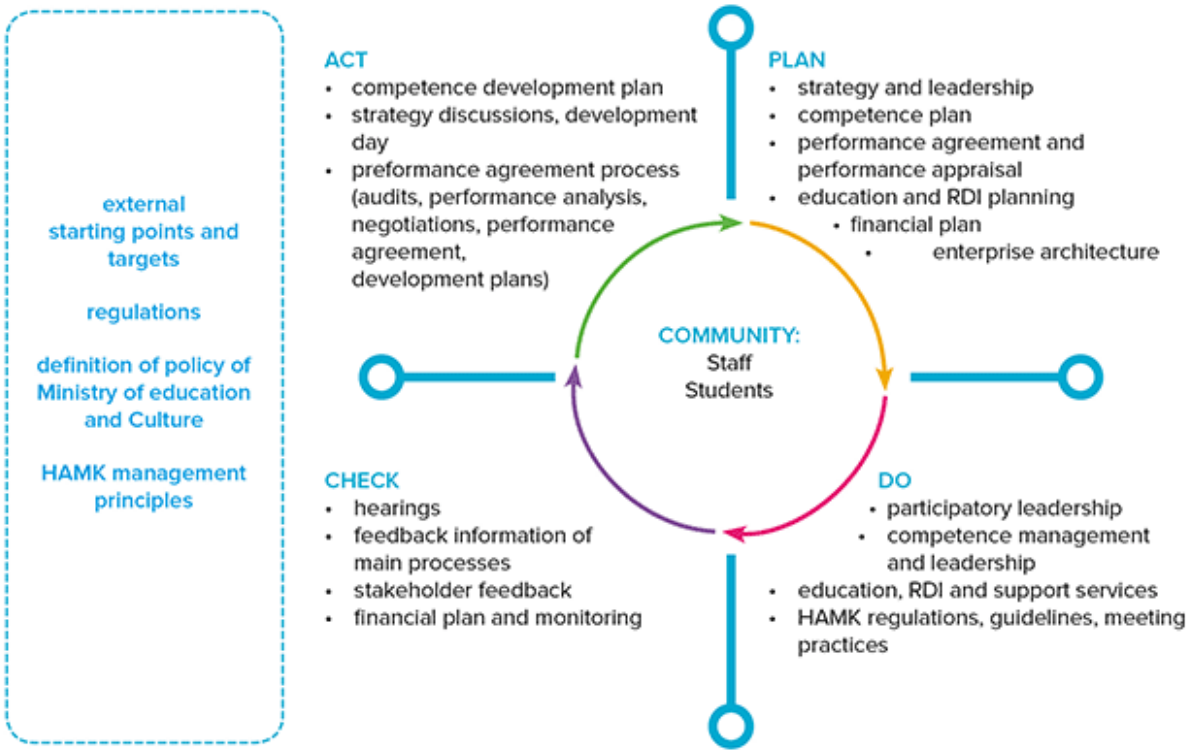
Finnish Education Evaluation Centre (Karvi) is responsible for evaluating quality systems of universities in Finland. The evaluation does not evaluate the activities of universities but the quality system that university has made to ensure the quality of its activities. The evaluation is made with same intervals and the results are valid for a certain time. Arrangements of the audit are very well organised and carefully planned. The audit is always independent from universities and is coordinated by people unrelated to universities.

Finnish Education Evaluation Centre defines quality system as:" Quality system refers to the development of the activities as a whole comprising quality management organization, division of responsibility, procedures and resources. Quality management refers to the procedures, processes or systems that the higher education institution uses to maintain and develop the quality of its activities." (Karvi, n.d.)

2.4 HAMK's quality system

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.)

Figure 2: HAMK's quality system



Source: Key quality management procedures and documents (HAMK n.d.).

Central part of this system is the feedback collected from students at the end of each module.

2.5 Funding system of universities

University system of Finland has been a subject of structural development in recent years. Premise has been the need to strengthen the quality of operation, effectiveness and international evaluation. Finnish National Agency for Education advances and supports this with its guidance. One of the key reforms concerns the funding system that was remodelled at the start of 2014. (Finnish National Agency for Education, (n.d.) The new funding model is based on effectiveness and efficiency. Figure 3.

Earlier the funding of universities was based on number of students and number of graduates. Progression of studies was monitored in two ways, so called graduation time and by number of credits. Graduation time meant the percentage of the students that graduated, and the time used. In 2007 - 2009 this was replaced by a meter representing

credits. During this time funding was based on how many students accumulated 45 credits during year. (Pääkkönen, 2010, 6–7)

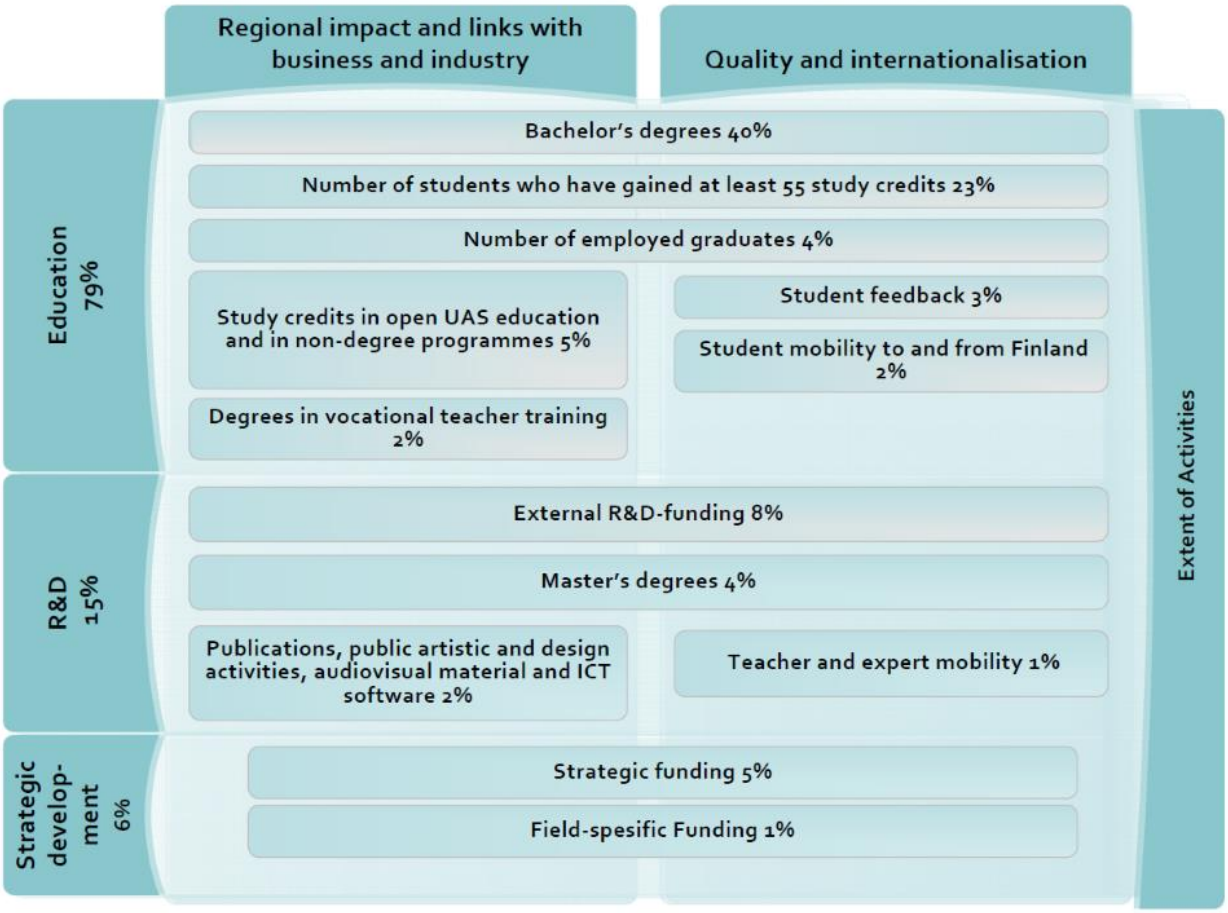
When the funding system changed to measure, the accumulation of credits arose the question that could this development lead to fall in quality in exchange for quantity. This subject stirred conversation between teachers: what is evaluated – know-how or results? How to evaluate – the process or the result? Who evaluates – teachers and/or companies? What is the significance of students' self-evaluation? What about peer evaluation? The conversation made clear the importance of the quality of education. The quality system of university and its improvement also rose up as essential.

One point of view is also the employment rate of students. Low quality teaching is short-sighted because it will lead to a lower employment rate of graduates. (Pääkkönen, 2010, 6 –7)

One of the objectives of the funding system reform was to speed up the time students take to graduate. Funding consists of 79% education, 15% research and development activities and 6% comes from strategic development.

Funding indicator being studied – students that have accumulated 55 credits during a year – makes up for 23% of the total funding. Progress of studies and surveying the number of students accumulating 55 credits also predicts the number of graduates. This increases the significance of the indicator even more regarding funding. (Figure 3)

Figure 3: University of Applied sciences funding model



Source: Ministry of Education and Culture

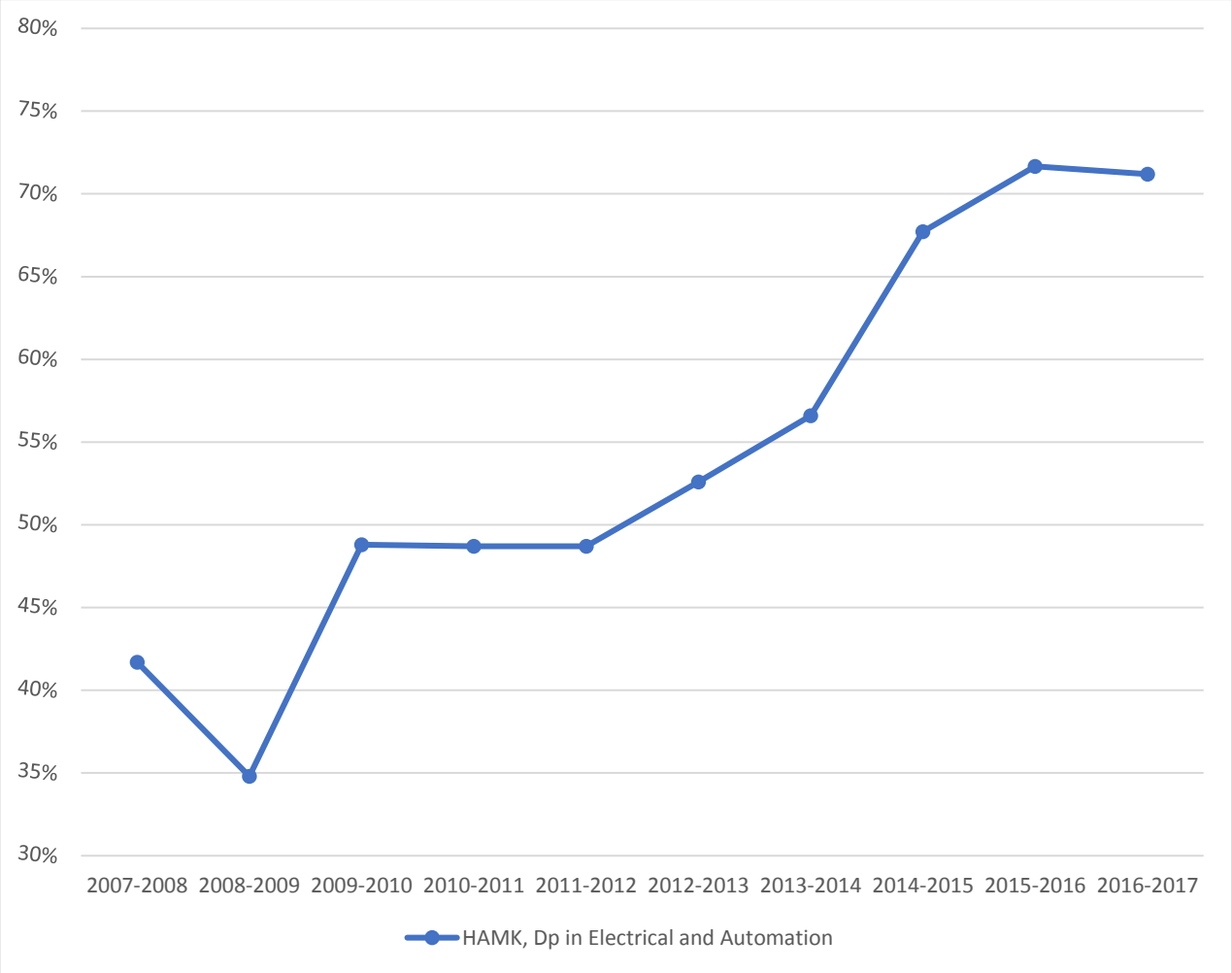
3 Development of credit accumulation in HAMK's Degree programme in Electrical and Automation Engineering

For reference, the calculated averages for different field of study 2003 - 2009: for science, technology and transportation students that accumulated over 45 credits was below 50%. Instead, for students of social services and heath care percentage was 65%. (Pääkkönen, 2010, 8)

HAMK's degree programme in Electrical and Automation Engineering credit accumulation in years 2007-2017 has been described in figure 4.

Degree programme in Electrical and Automation Engineering has managed almost double the number of students earning 55 credits. Figure 4.

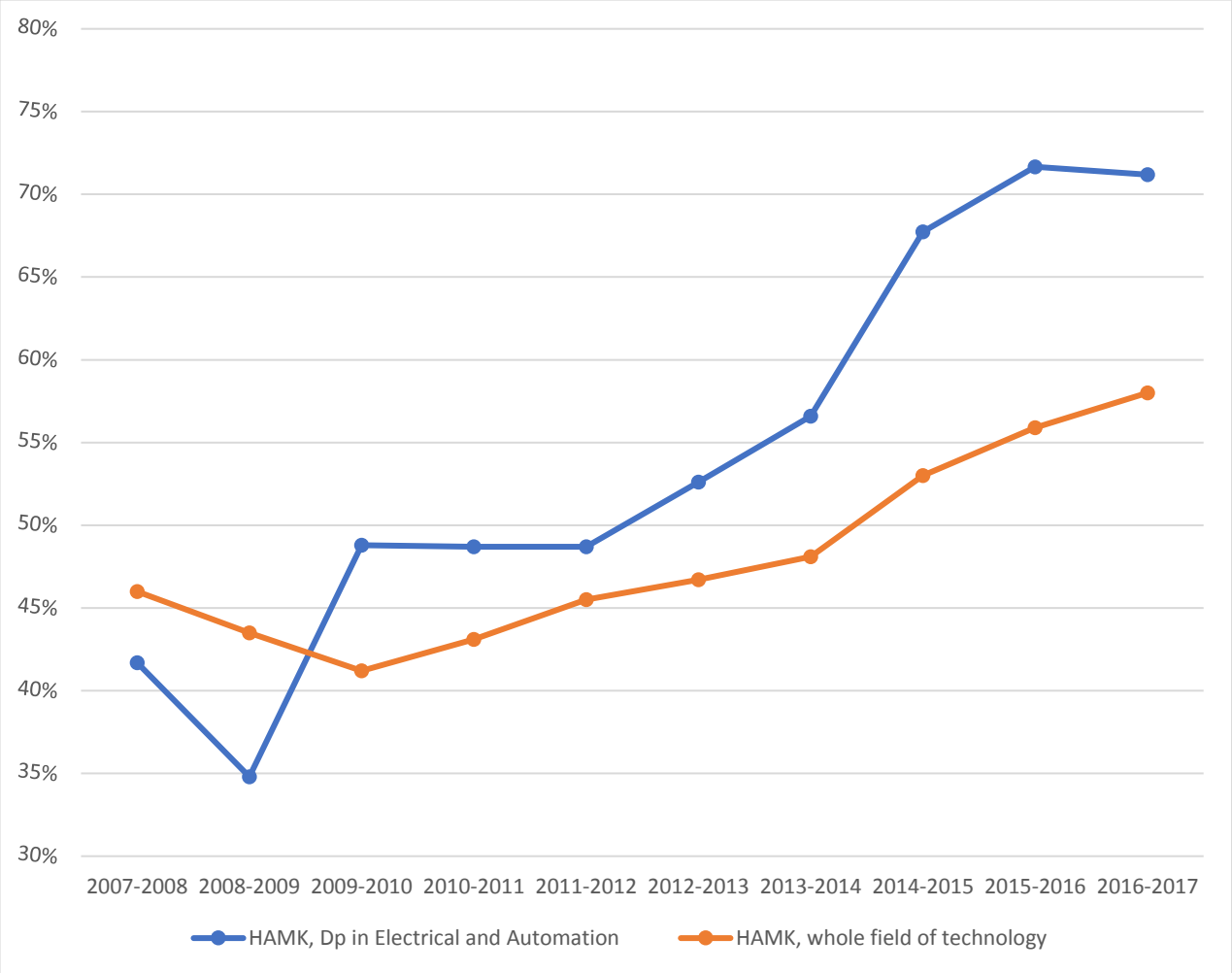
Figure 4: Ten years development amount of the students who gained at least 55 credit, HAMK, Dp in Electrical and Automation



Source: Vipunen (n.d.)

Next, we compare the development of HAMK's degree programme in Electrical and Automation Engineering to a few control groups. (Figures 5 - 8).

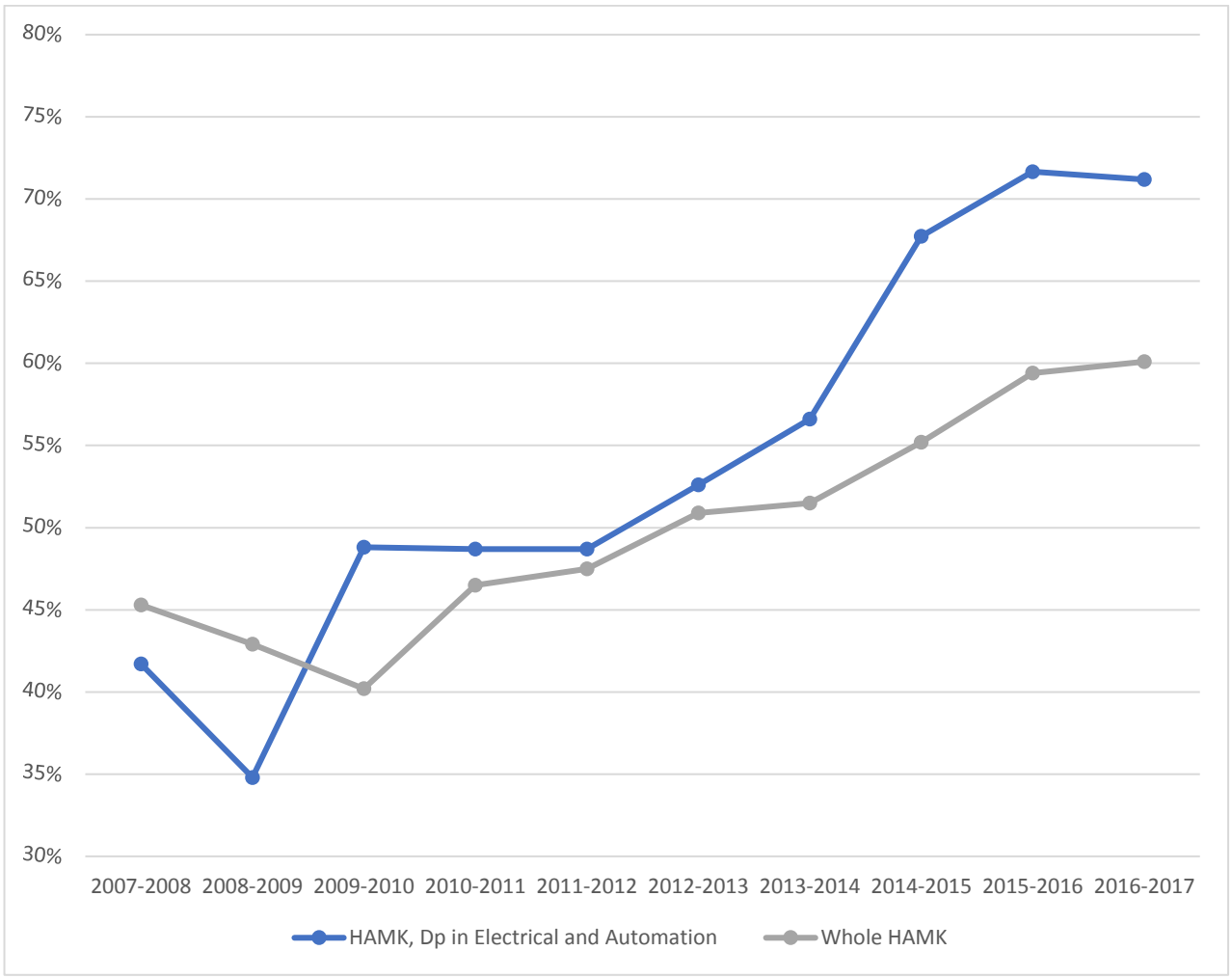
Figure 5: Ten years development amount of the students who gained at least 55 credit, comparison between HAMK, Dp in Electrical and Automation and HAMK, whole field of technology



Source: Vipunen (n.d.)

In picture 5, there is a comparison between HAMK, Degree programme in Electrical and Automation and HAMK, whole field of technology 55 credit accumulation. In both groups, there has been an increase in recent years. Ten years ago, HAMK's who field of technology had 4% points higher 55-point credit accumulation than electrical and automation. In semester 2009 - 2010 situation changed and electrical and automation was 8% points higher.

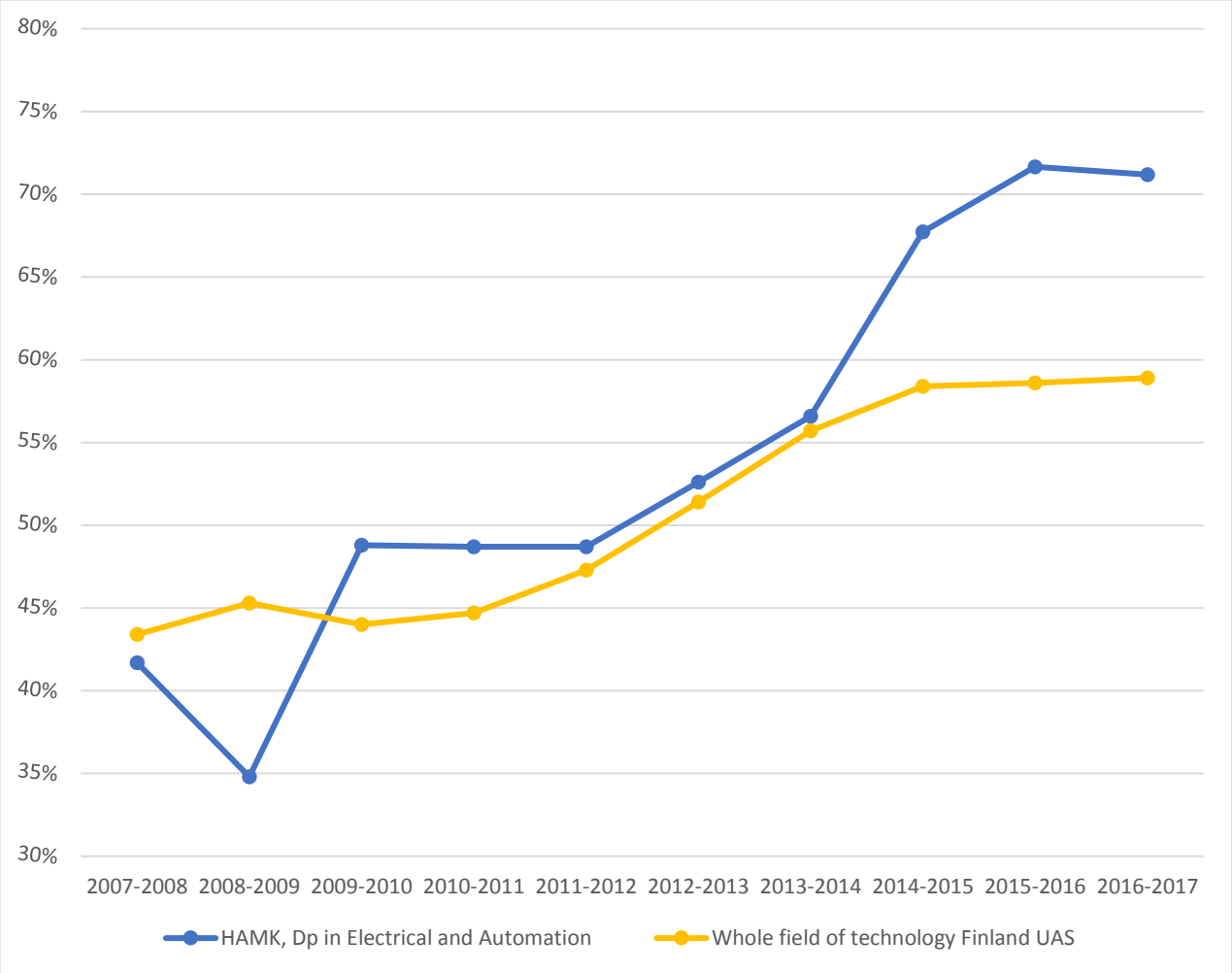
Figure 6: Ten years development amount of the students who gained at least 55 credit, comparison between HAMK, Dp in Electrical and Automation and whole HAMK



Source: Vipunen (n.d.)

When comparing accumulations to whole HAMK, the differences are a bit smaller. In semester 2016 – 2017, the difference was 11% points. The drop of semester 2008-2009 in electrical and automation credit accumulation can be explained by the starting of fully English language degree programme. In next semester, there was an increase of 14% points (Figure 6)

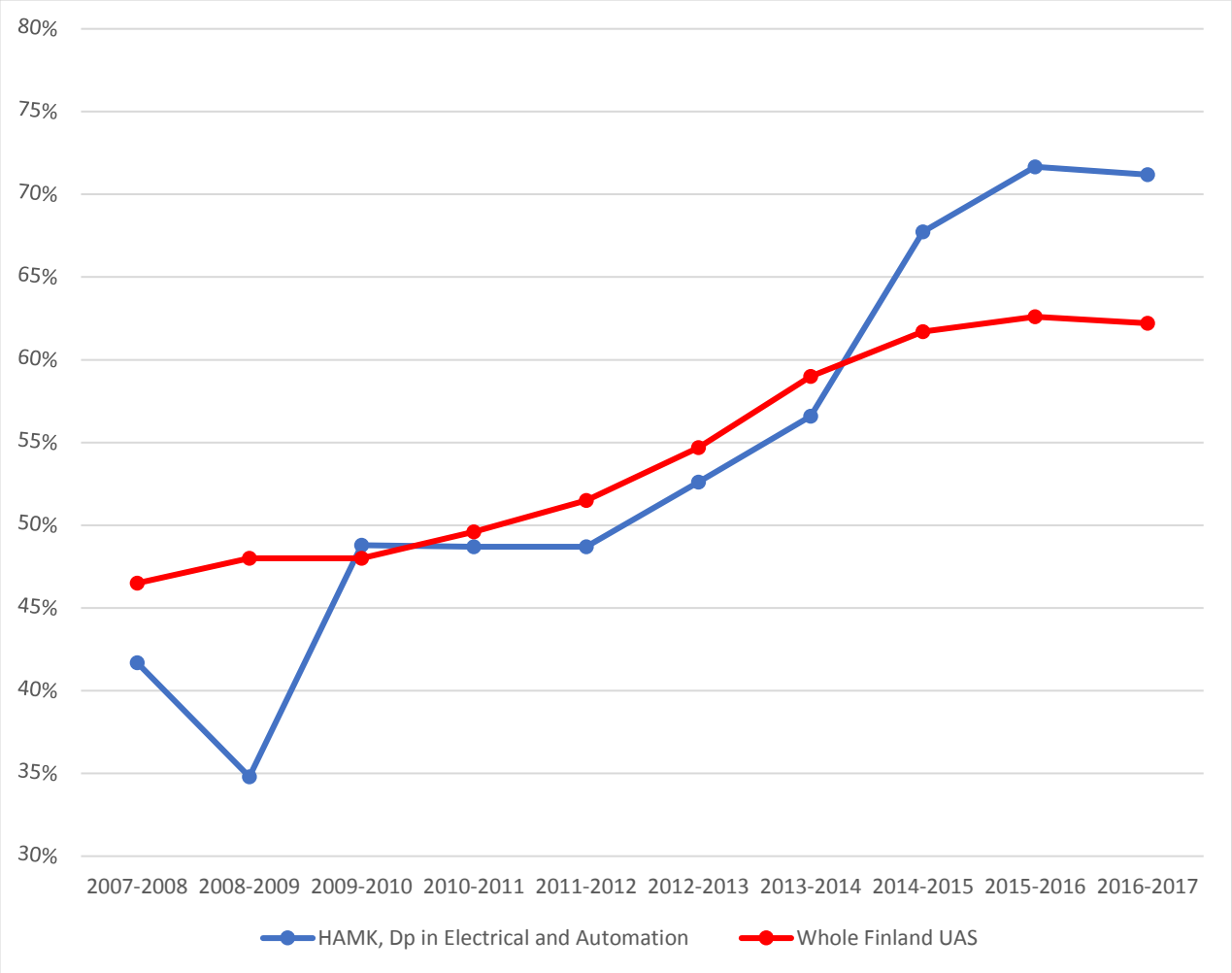
Figure 7: Ten years development amount of the students who gained at least 55 credit, comparison between HAMK, Dp in Electrical and Automation and whole field of technology Finland UAS



Source: Vipunen (n.d.)

In Figure 7, there is a comparison to whole field of technology in Finland Universities of Applied Sciences. Until semester 2013 – 2014, the accumulations were quite similar, but after that, it has widened to 12% points in favour to Valkeakoski Electrical and Eutomation degree programme.

Figure 8: Ten years development amount of the students who gained at least 55 credit, comparison between HAMK, Dp in Electrical and Automation and HAMK, whole Finland Universities of applied Sciences



Source: Vipunen (n.d.)

Figure 8 describes a comparison to all Finland Universities of Applied Sciences. In the period under review until semester 2013 - 2014 Electrical and Automation degree programme's credit accumulations were mainly below average of Finland. However, there was a change in semester 2014-2015. At the end of the period under review, the difference was 9% points in favor to Electrical and Automation degree programme.

What explains the strong rise that started 2014, 11% points? The changes to the funding system induced a strong need to remodel the way of operating. For example, the number of students that study while working has always been high in HAMK. Their studies where planned to progress at a slower pace so studying while working would be easier. After the changes, rhythm and educational decisions of the studies were remodelled.

When facing a great change an organization can stagnate or find solutions to problems together. In Electrical and Automaton degree programme the change strengthened the already good community spirit and at the same time, results got better.

4 Methods to achieve the results

The conclusion is the result of systematic observation, but an essential part is a culture that cares for students and innovative teaching and learning methods.

4.1 Credit accumulation monitoring

Accumulation of credits is monitored frequently during the whole semester. Focused monitoring is carried out near the end of semester. A summary is made of statistics that clarifies which of the students have challenges to keep in the planned schedule. The student's situation and possible actions are discussed in teacher meetings. Students are contacted, and suitable solutions arranged. For example, extra exam times and class reservations might be arranged so that students can finish their courses.

With these acts students feel that staff cares for their progression. This seems to motivate students and there has been good result regarding students with risk of falling behind with their studies or even suspending them.

Starting time of the approach mentioned above suggests that it is one of the factors leading to positive development in years 2014 - 2017.

4.2 Experimentation culture

Experimentation culture is one of the top projects of the current government. Complex challenges are chopped to smaller pieces for a sample to get results that can be scaled. Experimentation culture is way to test new ways of operating. (Kokeileva Suomi, n.d.)

In order to generate new jobs entrepreneurship and experimentation needs to be invested in. The importance of education is recognized, but our education system needs remodelling. According to Nieminen (2018), Erik Brynjolfsson values of experimenting culture are courage, open-mindedness, interactivity, trust, tolerance of uncertainty, willingness to learn and risk-taking.

According to Tapu Holttinen (n.d), experimenting culture on personal level means "good managing of yourself, progressive approach to work, having a hold of what you have learned and also of your work and working community, wanting to implement shared leadership and expertise every day, having courage and ability to learn and act together".

Going to community level it means positive atmosphere toward learning and growth where “renewing is a way of living in spirit of musketeers one for all, all for one”. The colleagues encourage to take risks and it is allowed to try and improve. In that kind of community there is no need to fear to make mistakes. The culture is success centered where all the good things are celebrated together. (Holttinen, 2018).

HAMK's Electrical and Automation study programme is actively searching for ways to improve learning results. Location of the campus is a bit challenging: small city near few big ones. The small size of the city and campus has been turned in to a strength. Staff knows each other and students. It is easy for the students to approach staff. A good team spirit is built by different ways. Trying and learning from errors is permitted and encouraged.

Group-oriented working is highly supported. Team based teaching was introduced when the current strategy was being implemented in 2014. Team based teaching means that all teaching is planned and implemented in teams. Co-operation is no longer dependent on teachers’ preferences on working. The teaching model based on the university’s strategy highlights the co-operation of teaching staff. Working together is a normal and systematic way of teaching.

Remodelling study implementations and starting different experiments is natural part of the team’s operation. Successes and mistakes are shared together. This requires good team spirit and supporting superior. Result is a healthy working environment.

4.3 Work satisfaction

Working life is at present undergoing a change and is subject to great pressure to change. There is also a need to think about different ways of working on the education side to increase productivity. Competitiveness is sought from innovation, speed and flexibility. Digitalisation enables the use of interactive information and communication technologies in teaching. (Manka & Manka, 2016) Digitalisation has been one of the cornerstones to development of HAMK's operations.

One of the key guarantees for growth in organizational competitiveness is the increase in employee well-being at work. With good management, employers can influence the accumulation of work well-being. Along with facts, feelings should be taken into consideration. Important factors in work well-being include, opportunities for employees to influence decision making, flexibility of working life, opportunities to develop oneself and career planning. (Manka & Manka, 2016)

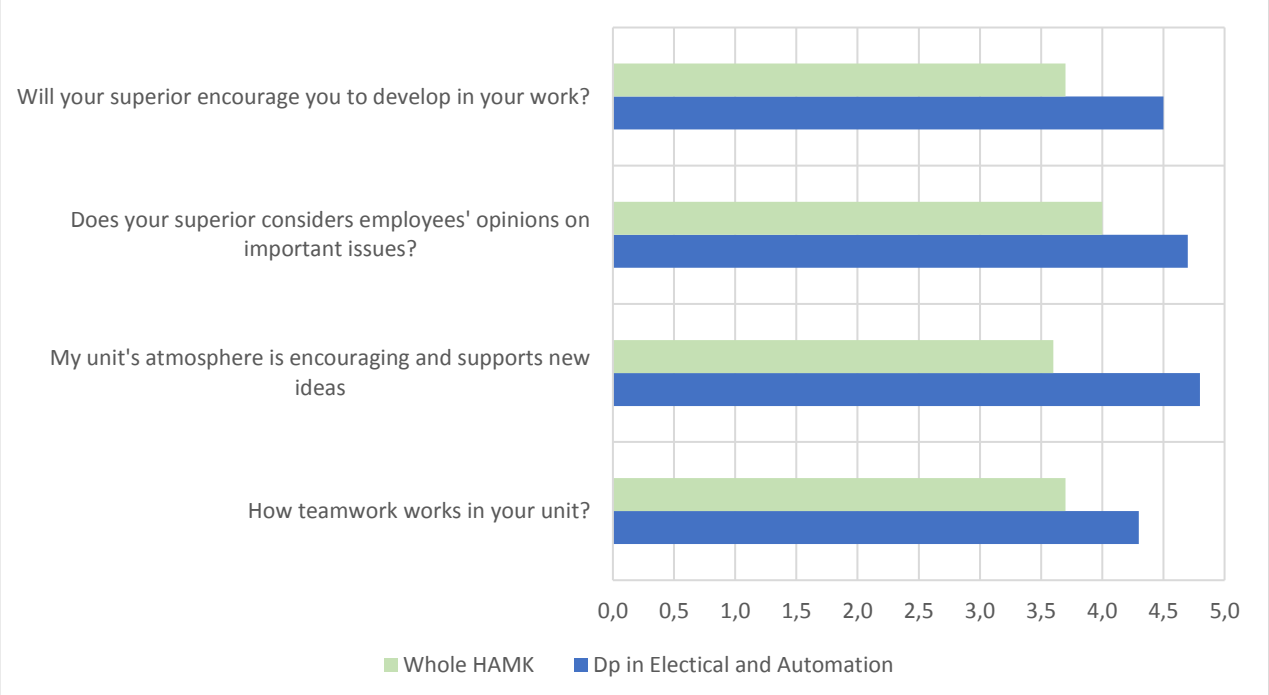
Work well-being is not subject to superiors only, but individuals also have responsibility in their own well-being. Positive attitude, adaptation to change, and continuous development

of expertise increase work well-being. Interaction and social relations between community members increase social capital, which assets individuals and working community at whole. (Manka & Manka, 2016) Importance of community-based approach and team teaching has been emphasized throughout the current strategic horizon.

In traditional management model, superior's task is mainly to supervise their subordinates, as it is thought that employees are only paid for work and seek to avoid responsibilities for their work. Modern models emphasize contemporary interaction; employees are treated as individuals, important and useful. Personnel are encouraged in developing their skills and participating in decision-making. (Manka & Manka, 2016) In HAMK, this is seen as an opportunity to create different career possibilities and increase in expertise. In addition to voluntary self-study, development and coaching programs are provided to staff to reach strategic goals.

On certain intervals, all employees will participate in standardized occupational health survey developed by the Finnish Institute of Occupational Health. Last one was done at the end of 2016. Results for both HAMK and the degree programme in Electric and Automation engineering are excellent, which supports the view of close relationship between innovative atmosphere, learning outcomes and work well-being. (Figures 9 - 10.)

Figure 9: Results considering team, atmosphere and leadership



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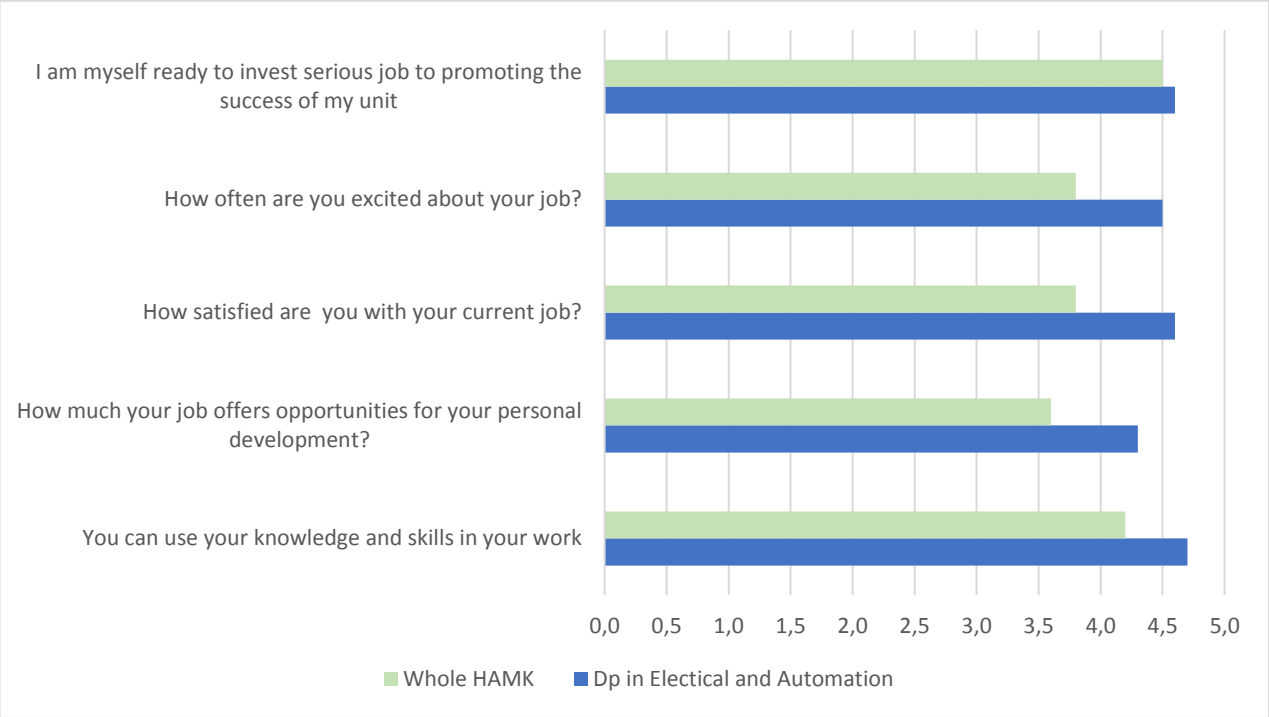
In The survey, statements are evaluated on a scale of 1 to 5. As Shown in figure 9 results, the employees of HAMK are pleased with their work environment. The best results by the average score of 4.8 gets the statement: My Unit's atmosphere is encouraging and supports new ideas. The manager was also considered to take great care of employees when making decisions which concern them. The superior also encourages and gives opportunities to develop at work. Teamwork was also evaluated to be working well.

Figure 10: Results related to the employee's personal satisfaction.



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According to the survey (figure 10) the possibilities for personal development in HAMK, and especially the Electrical and Automation programme are good. According to the results, employees were willing to invest in their work for the success of their workplace. The staff was also enthusiastic about their work and committed to the goals

4.4 Pedagogical management

In a well-being and innovative university work community, teaching staff have a clear pedagogical identity and assume responsibility for developing their work and for their own pedagogical leadership. Pedagogical leadership is related to pedagogical identity.

Korhonen, Nevgi & Stenlund (2011, 40) look at pedagogical identity from the point of view of tension between the traditions of the field of study and the pedagogical new creation. A person can have an identity of tradition of defending and preserving or an identity more based on learning. The latter promotes co-operation between different field of studies, and results gives a common perception of what is good teaching and learning. In this case, the learning process is looked at as a general phenomenon independent of the subject.

Pedagogical management is commonly referred to as the teaching management. It can be thought to be included in the role of leader and supervisor. It is often linked to study counselling, tutoring and management role of various development projects. Pedagogical leadership can also mean co-design and implementations as well as various pedagogical solutions, which have a direct connection to increasing the percentage of graduates. That is why it affects all who are working in jobs related teaching. (Huhtanen, 2012, 40)

Huhtanen (2012, 50) also emphasizes the importance of so-called "key actors" or intermediaries. There are different leaders of development teams, education managers and others responsible for implementing the changes.

However, such "traditional" implementers can also be the teachers' teams based on team teaching model, which especially seek new ways to implement the teaching. The team's pedagogical identity is strong. The education background does not impede the team members' cooperation. Liability is levied together. Thus, pedagogical leadership has moved closer to the student, to the grass-roots level. This phenomenon is seen as a key factor in the positive development mentioned in the article.

5 Conclusion

It is possible to promote the progress of the studies through purposeful work. The changes in the credits accrual described in the article are not incurred by chance. The credit accumulation is a financial impact measurer, but long-term and sustainable results are only possible if quality is invested. The importance of a model of continuous development based on the quality assurance system is emphasized especially in the phase of change.

The University succeeds when it is able to create a positive development circle. Growth in employees' well-being is a major guarantee for competitiveness. The well-being teaching staff are prone to experiment and develop - and willing to lead their own work.

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