

This is a self-archived – parallel-published version of an original article. This version may differ from the original in pagination and typographic details. When using please cite the original.

AUTHOR Huhtala Mikko, Lindfors Eila

TITLE Qualitative Anticipation to Forecast Employees' Future Professional Competencies: Considerations from the Viewpoint of Education

YEAR 2021

DOI

VERSION Publisher's pdf

CITATION Huhtala, M., & Lindfors, E. (2021). Qualitative Anticipation to Forecast Employees' Future Professional Competencies: Considerations from the Viewpoint of Education. *Techne Series - Research in Sloyd Education and Craft Science A*, 28(2), 31–40. Retrieved from <https://journals.oslomet.no/index.php/techneA/article/view/4360>

License

Copyright (c) 2021 Mikko Huhtala



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Qualitative Anticipation to Forecast Employees' Future Professional Competencies

Considerations from the Viewpoint of Education

Mikko Huhtala and Eila Lindfors

In daily practice, skills enable the professional competencies that are required for successful work. The qualitative anticipation of professional competencies gives information about the knowledge and skills that will be required for the future. Anticipation is challenging in the technical field, since it is easy to consider technological and engineering developments alone. The objective of this study was to get respondents (N=65), professional experts, to think their professional competencies from various viewpoints and across different periods of time using a Janus Cones method. Analysis reaches until the year 2025. Using thematic content analysis, we identified seven main categories as the components of professional competence in the future of retail automotive services. These are safety and security competence, business management competence, human resource management, vehicle technology, general skills and knowledge, environment and quality competence, and customer service. "General skills and knowledge" was the only component that referred to general competence. The other six categories are clearly contextually bound to retail automotive services, but they might also be usable in other technological and study programs. These results can be used to develop technology education and curricula at various levels of education, especially in automotive education. They also offer information for comprehensive schools as to how working life and professions are changing.

Keywords: professional competence, curriculum, anticipation, education, retail automotive services, vocational, technology

Introduction

After completing vocational education, young professionals seek out workplaces in order to further develop their professional competence. However, every branch of society is changing rapidly due to technological development. This means that every profession can expect to undergo changes in the future. Some professions are disappearing, while new jobs are being born as well. In all contemporary societies, there is an ongoing discussion about the competencies that will be required of employees in future. The qualitative determination of requirements for future employees and new types of professions provides information for vocational education about the kinds of new skills and knowledge that will be

needed at workplaces in the future. It also allows vocational and higher educational institutions to consider which professional and study programs will be needed.

In the Finnish National Basic Education Core Curriculum 2014, hands-on learning about vehicles, automotive, and engine technology belongs to the subject Craft, Design, and Technology (CDT) as part of STEAM education (FNAE, 2016). The retail automotive field as a career path is taught under the subject vocational guidance. This subject is studied in lower secondary education, which is comprised of grades seven through nine with students aged 13-16 years in Finnish comprehensive basic education. Higher secondary education covers grades 10 through 12 (students aged 16-19 years) in general and vocational education. Teachers' understanding of future professional requirements and competencies gives them valuable information that can be used to guide their students in choosing next steps for higher secondary education. For instance, students may wish to pursue a profession in vocational education or to take a general higher secondary education path and orient themselves toward a profession afterward, for example, to automotive technology and/or retail automotive management in higher education.

The changing use of technology in our digital society implies changes in the content of vocational studies. The development of vocational education requires qualitative investigation and anticipating future professional requirements and competencies as well as workforce demands in car retail. Without quantitative predictions there is no informational basis upon which to plan the amount of study programs and professional pathways. A key question is what kind of competencies, attitudes, knowledge, and skills (Mulder, 2012) should be focused on in vocational and higher education in the near future to enhance students' ability to meet future workforce requirements. Considering future professional competencies is an important qualitative prediction tool, as it can clarify what changes are needed in the content of vocational education retail automotive study programs. Professional competencies generally refer to the demand for professional skills and knowledge as well as so-called "soft skills" or general skills. The quantitative prediction of future workforce needs offers information on how many study places will be required to provide workers to the various professions (Huhtala, 2014). The goal of making these predictions is to foresee changing needs in educational volumes and programs early enough to respond to societal needs. Anticipatory analysis can also provide knowledge about the balance between required and supplied skills in the workforce. Qualitative anticipation can provide information about entirely new kinds of requirements that emerge from the development of professions and new competencies that education must provide in the future. (Huhtala & Lilja, 2007; Huhtala, 2014)

This paper considers the retail automotive field in Finland. Retail automotive services are one part of the automotive industry, including both car sales and after-sales services. Data was gathered from experts working in retail automotive services. The main target of this paper is to present an anticipatory description of the kinds of professional competencies and qualifications that will be the most important to retail automotive services in the future. This study uses an expert survey (N=65) to produce new knowledge on the professional competencies that will be required in retail automotive services in the future. The study question is: What professional competencies do experts consider valuable to the future of the retail automotive services?

The consideration of changes in educational volumes and content demands always requires qualitative anticipation. This paper also discusses professional competencies in retail automotive services in the context of comprehensive education and general higher secondary education. Qualitative anticipation in the automotive field is a part of the larger of for planning for future employment in the transportation

and aviation industry (Huhtala, 2014). Conclusions will be offered as to how education and curricula should be developed according to the results.

Theoretical Background

Retail automotive services and prospects for the future

The retail automotive is not only the process of selling cars. It also includes mechanical services, spare part departments, and body repair facilities. Car dealers usually operate with a franchising model and are traditionally located outside of town centres, where there is enough room for showrooms, including both new and used vehicles and other services. Both automotive vehicle producers and dealers face a changing environment and they have been forced to rethink their traditional operations to appeal to customers' demand for customization and connectedness. In the future, the process for purchasing and owning vehicles will change (Dinsdale, Willigmann, Corwin & Glueck, 2016; Sorescu, Frambach, Singh, Rangaswamy & Bridges, 2011; Ström, Fischer & Hourmouzis, 2018). Furthermore, customer expectations for products will change as new vehicle technologies become more common.

Knowledge and professional competencies

Because knowledge has many dimensions, it is impossible to simply classify professional knowledge. According to Hoy and Murphy (2001), human thinking is a blend of beliefs, values, knowledge, and moral judgements. Knowledge is often factual, verified, and logically organized ideas, whereas belief is the combination of ideas and propositions. Both knowledge and beliefs give one the ability to feel secure about the truth despite contrary opinions. Markauskaite and Goodyear (2014) classify knowledge into the three categories: public, personal, and organisational. This tripartition fits also for anticipating needed future skills and knowledge. Public knowledge is made up of available culture and has two different components. The first is codified public knowledge, which includes educational resources, qualification standards, and information from books and journals. The second is non-codified public knowledge, which includes professional education that comes through participation in working practices. Personal knowledge is the combination of one's mental constructs such as facts, stories, procedures, experiences, and principles (see: Hero, 2019). Organizational knowledge is specified as an internal property of an organization, which is contextually bound by the environment and type of enterprise (Markauskaite & Goodyear, 2014). One way to define skills is to divide them into two main categories: hard skills and soft skills (general skills). Hard skills are skills that can be acquired through education or training at a workplace (Gale, Duffey, Park-Gates & Peek, 2017; Wisshak & Hochholdinger, 2020). Soft skills are typically bound to social and personal behaviour, like the ability to work well in groups (Heppner, 2018; Ritter, Small, Mortimer & Doll, 2018). According to Seery, O'Connor, Buckley and Doyle (2016), soft skills have four grades: capture, context, coherence, and perspective.

Professional competence is a combination of the various competencies such as knowledge, skills, and attitudes, and is always context dependent (Hero, 2019; Mulder, 2012). Management was one of the first areas where competence models were developed. These competence models still have a special role in the organizations and enterprises where there are differentiated functions such as finance, sales, marketing, leadership, informational systems, and logistics. According to Mulder and Winterton (2017), competence-based education is a huge step toward a more authentic and holistic education, where students can progress toward a deep and coherent unity instead of memorizing fragmentary information. For graduates to be employable and settle into their position in society, graduates must be able to adapt

their knowledge to a specific context. For example, effective job performance demands problem-solving and cooperative skills that are learnt through experience (Kolb & Kolb, 2011). The new generation needs the abilities to deal with change, such as changing value patterns, intercultural tensions, and societal risk and uncertainty (Mulder, Weigel & Collins, 2007).

Professional competence in vocational education

Professional competence is not just knowledge acquired in vocational education. Today, it refers more to the ability to use knowledge and skills in the social interaction. Competence consists of several components, such as knowledge, skills, attitudes, experience, and personal qualities. Together, these create the basic materials for competence in work and life (Ellis & Allan, 2010; Ojala, 2008). Professional competence is thus created by the combination of skills and knowledge. As these are used widely, creatively, and combined together, workers acquire knowledge that includes methods of organizing work, working as a part of a team, the capacity to be flexible, accepting changes at work, and developing one's own working skills (Fredman, 2013; Hätönen, 2005). According to Hero (2019), future orientation is important in order to focus on new experiences and find opportunities to innovate. Using creative thinking skills helps in idea generation and problem solving. Further, using cognitive skills allows workers to create new knowledge through analytical thinking as part of innovation process (Hero, 2019).

Methods

This anticipatory study is part of a larger research project. The automotive, transportation, and aviation survey was implemented in Finland in 2013 using qualitative research methods (Huhtala, 2014). The projection timeline reached until 2025. A questionnaire was sent to all companies which were members of the Finnish Central Organisation for Motor Trades and Repairs. The main objective of the survey was to get respondents, professional experts, to think about their professional competencies from various viewpoints and across different periods of time. In the automotive section, the group of expert respondents was 65 individuals. Most of these were employed in service, bodywork, and paintwork (56%), spare part sales (2%), car sales (6%), or in other areas (37%).

There are three main groups of personnel in companies: managers, supervisors, and workers. The professional competencies and qualifications of the managerial and supervisory positions can be studied in universities or in universities of applied sciences. The qualifications of the worker positions can be typically studied in vocational schools in higher secondary education. These three main groups represent ready-made occupational groups in companies, but the respondents had also the possibility to add their own occupations or special craft skills to other occupational groups. The survey revealed qualifications from the occupational groups in two periods: medium-length qualifications (greater than five years) and long-term qualifications (greater than 10 years). This followed a Janus Cones method (Fig. 1) that looks backwards and make predictions for the future using timed steps.

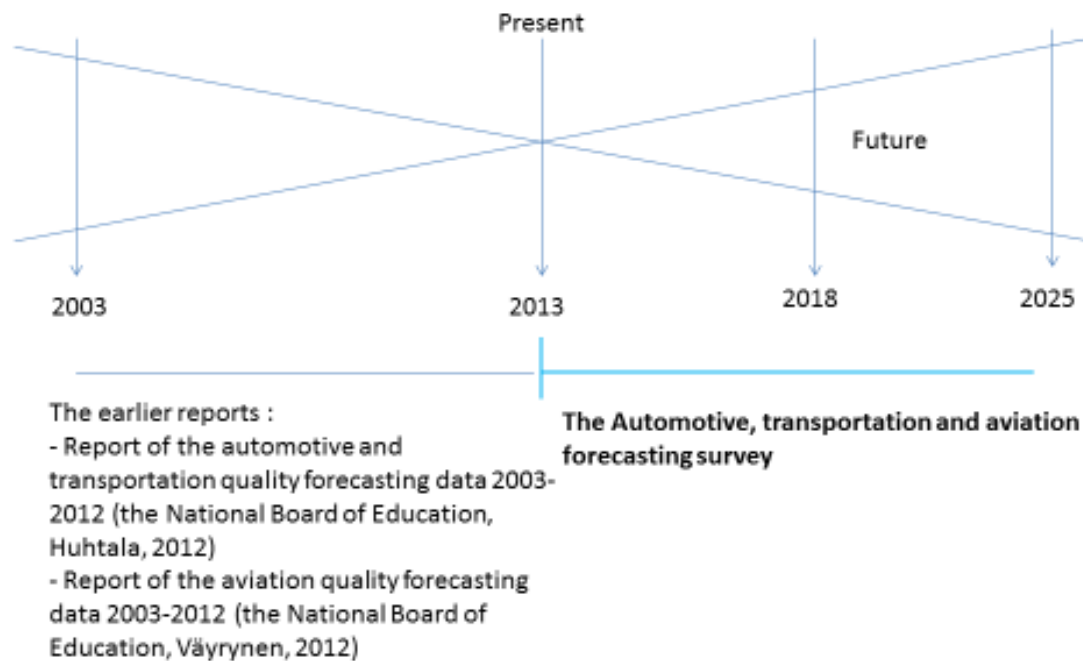


Figure 1. Janus Cones method.

In the Janus Cones forecasting method (Figure 1), each vertical marker denotes a specific period of time, such as five, 10, or 15 years. The centre of the two cones describes the pre-set moment (Carleton, Cockayne & Tahvanainen, 2013). The left cone describes previous patterns on the basis of the earlier reports of Huhtala (2012) and Väyrynen (2012), which also formed the basis for the more recent survey. The right cone describes the future. Future patterns often reflect past ones. However, they are not complete repetitions of them. Periods of time (Fig. 1) which may not have a timely connection can have an influence over periods and processes (Carleton, Cockayne & Tahvanainen, 2013; Heinonen & Ruotsalainen, 2013).

The survey responses were divided into three time periods according to employers' professional competence by time: short-term qualifications, medium-term qualifications, and long-term qualifications (Fig. 1). All questions were open and all presentations of the subject matter were as neutral as possible. The aim was to ensure that questions did not guide respondents' considerations and answers. This study uses thematic content analysis (Krippendorf, 2019). The written data was reviewed and monitored using categorization. The answers of the respondents were first categorized into baskets that were then assigned to seven subcategories. Here, present results that summarize core competence categories until 2025. The specific results for the time periods of five, 10 and 15 years are presented in detail in Huhtala (2014).

Results

On the basis of thematic content analysis we identified seven main categories as the components of professional competence in the future of retail automotive services. These are safety and security competence, business management competence, human resource management, vehicle technology, general skills and knowledge, environment and quality competence, and customer service.

For *safety and security competence*, the main issues raised by the respondents were new vehicle technologies, especially electrical and gas vehicles, and the special knowledge and skills that are needed to work with these vehicles safely. This is included under occupational safety, where experts were concerned about the common well-being at work.

The second component was *business competence*. This included financial administration, service innovation, and anticipating skills. Retail automotive services experts were concerned about their skills in managing financial issues in future business environments. This included the knowledge and skills to make the innovations needed to keep the business running. Being able to anticipate the future was seen as an important part of business competence, since it was seen to have a key role in the successful management of the retail automotive business.

The third component was *human resource management skills*. This included communication skills, people skills, specialist skills, and project management. Communication and people skills were seen to be required for communicating well within the business. Specialist skills were the skills required to enhance cooperation between several specialists in order to solve complex problems within retail automotive services. Furthermore, project management skills in order to manage special cases or renovate management structures were seen as important.

The fourth component was *vehicle technology knowledge and skills*, including diagnostics, programming, new forms of energy, new alloys, mechanics, chemistry, and electronics skills. New kind vehicle technologies, like electric cars, are examples of where new knowledge and skills are required. To carry out diagnostics, programming, and electronics with new vehicles, one needs to know how to handle new types of instruments and use ICT knowledge according to the varying vehicle systems. In addition, the new alloys that are used in car chassis represent a totally new area of material handling and repairs in retail automotive services.

The fifth component was *general skills and knowledge*, including common teamwork and interaction skills, language skills, and information technology skills. The sixth component was *environment and quality competence*, including environment and quality systems and standards. The respondents mentioned that in the future there is an expanding need of being aware of the various national, EU, and international standards that are required in order to provide high-level service. The quality of service on offer was seen a combination of understanding and using quality systems.

Customer service competence was the seventh component, comprising social and communication skills with customers as well as service abilities. Customer satisfaction was seen as the most important competence in all personnel groups, from the managerial to worker levels, for business development and sustainability.

Discussion

The main motive for undertaking this study was the rapid technical progress in automotive engineering and the emerging changes in the retail automotive business that require a re-evaluation of professional competencies. With the Janus Cones anticipation method (Carleton, Cockayne & Tahvanainen, 2013), we identified seven categories as the components of future professional competence in retail automotive services. These categories are safety and security competence, business management competence, human resource management, vehicle technology knowledge and skills, general skills and knowledge, environment and quality competence, and customer service. “General skills and knowledge” refers mostly to general competence (Seery et al., 2016). The other six categories were clearly contextually bound in retail automotive services and differed in some important ways from common definitions of soft and hard skills (Gale et al., 2017; Wisshak & Hochholdingner, 2020). Thus, these categories might be usable in other branches of business and in the formulation of other programs of study. In thematic analysis, it was not possible to differentiate competencies according to public, personal, and organisational points of view as Markauskaite and Goodyear (2014) suggest. The results strongly agree with Mulder (2012), Mulder and Winterton (2017), and Mulder et al. (2007) that skills and knowledge need to be used widely, creatively, and combined practically to produce new types of knowledge to enhance competence in a given context. Key skill areas include methods of organizing work, teamwork, being flexible, and accepting changes at work (e.g., Ellis & Allan, 2010; Fredman, 2013; Hätönen, 2005). For example, the basic principles of safety and security (knowledge) have to be applied (skills) in a certain workplace in a way that creates and guarantees occupational and customer safety. Sometimes this process can even produce an innovation (Hero, 2019) if it is used in an analytical and future-oriented manner.

These results demonstrate what the professional experts in the automotive industry (N=65) considered to be the important professional competencies for the future of retail automotive services. The Janus Cones method (Carleton, Cockayne & Tahvanainen, 2013) allowed to undertake thematic content analysis on data (Krippendorf, 2019), creating new knowledge about professional competencies in retail automotive services and for vocational and comprehensive education more widely. Results are not generalizable outside Finland, even though the vision of future competencies was often shared between respondents. In Finland, these results can be used in the evaluation and development of curricula and study programs in the automotive section, both in pre-service and in-service training, along with comprehensive and CDT teacher education. Furthermore, they can act as an additional example of future professional competency needs (Heinonen & Ruotsalainen, 2013). Methodology can serve as a basis for planning future studies, such as a wider quantitative survey. The next step could be a deep comparison of competence classifications or conducting a theory-based categorization of the data in order to compare the competencies from various theoretical viewpoints.

Anticipatory data considers the situation for professional competencies until the year 2025. Although the data for study is from 2013, the discussion of future professional competencies in retail automotive services is even more relevant today. For example, developments due to climate change and changes in the market economy require continued vigilance and reconsideration, such as the rise of electrical cars and the joint use of vehicles. One implication of results for programs of study is not just the seven identified areas of future professional competency but also that the proper way to study and learn these competencies is using knowledge in a real context. This means more experiential learning (Kolb & Kolb, 2011) in an authentic workplace context, instead of studying theory to acquire knowledge in various

educational programs and merely practicing it afterwards. Employability requires that graduates be able to adapt their knowledge to a specific contextual challenge, e.g., changing regulations due to climate change, which presupposes effective performance in the form of problem-solving and co-operative skills. In addition, there is a need to reconsider core abilities, such as changing value patterns, intercultural tensions, and societal risk and uncertainty (Mulder, Weigel & Collins, 2007) which were not recognized in this analysis but are certainly important in a post-COVID-19 society.

For vocational, secondary, and higher education teachers, more practical experience in considering future professional competencies in in-service training should be required. Student teachers should be trained in the field of engineering with new vehicles to advance their knowledge of future needs. Teachers should have training in information, hybrid, electric, and material technologies. In addition, teachers should get experience applying teaching methods in a real work-life context. If there is no vehicle technology and engineering in lower comprehensive education or higher general education as part of STEAM education, we should ask what students interested in automotive technology gain from either vocational or higher education. For teachers in secondary and higher education the seven quality components as parts of professional competence can offer a tool to evaluate and develop improved programs of study and teaching content.

References

- Carleton, T., Cockayne, W., & Tahvanainen, A.-J. (2013). Playbook for strategic foresight and innovation. Retrieved June 1, 2020 <https://www.thegeniusworks.com/wp-content/uploads/2016/01/Playbook-for-Strategic-Foresight-and-Innovation-A4.pdf>
- Dinsdale, A., Willigmann, P., Corwin, S., & Glueck, J. (2016). The future of auto retailing Preparing for the evolving mobility ecosystem. Deloitte University Press.
- Ellis, R. & Allan, R. (2010). Raising aspiration and widening participation: diversity, science and learning styles in context. *Journal of the Further and Higher Education* 34(1), 23-33.
- Fredman, N. (2013). Student movement: Pathways, fields and links to work. *The International Journal of Training Research* 11(1), 5-16.
- FNAE. (2014). National Core Curriculum for Basic Education 2014. Oppaat ja käsikirjat 5. Finnish National Agency for Education. Retrieved June 5, 2020 <https://eperusteet.opintopolku.fi/#/fi/perusopetus/419550/tiedot>
- Gale, A. J., Duffey, M. A., Park-Gates, S., Peek, P.F. (2017). Soft Skills versus Hard Skills: Practitioners' Perspectives on Interior Design Interns: SOFT VS. HARD SKILLS. *Journal of Interior Design* 42(4), 45-63.
- Heinonen, S. & Ruotsalainen, J. (2013). Futures Clinique -method for promoting futures learning and provoking radical futures. *European Journal of Futures Research* 1(1), 1-11.
- Heppner, H. J. (2018). Soft Skills: Etwas anderes Doping. *The Journal of Gerontologie und Geriatrie* 51(2), 160-164.
- Hero, L-M. (2019). Learning to develop innovations. Individual competence, multidisciplinary activity systems and student experience. Doctoral dissertation. Annales universitatis Turkuensis, 475, University of Turku, Finland. https://www.utupub.fi/bitstream/handle/10024/147038/Hero_PhD_dissertation_FIN_FIN.pdf?sequence=4&isAllowed=y

- Hoy, A. W. & Murphy, P.K. (2001). Teaching educational psychology to the implicit mind. In B. Torff & R. J. Sternberg (Eds.), *Understanding and teaching the intuitive mind: Student and learning* (pp.145-186). Lawrence Erlbaum Associate.
- Huhtala, M. & Lilja, K. (2007). ProEduca – Peruskoulusta ammatillisiin opintoihin. [ProEduca – from comprehensive school to vocational school]. University of Turku, Finland.
- Huhtala, M. (2012). Auto- ja kuljetusalan laadullinen ennakointi. [Pre-analyses of professional competences in automotive- and transport section]. Finnish National Board of Education.
- Huhtala, M. (2014). Auto-, kuljetus- ja ilmailualan koulutuksen laadullinen ennakointi. [Qualitative anticipating of a automotive field, transportation and aviation field]. Tampere University of Technology, Finnish National Board of Education, publications 2013:10.
- Hätönen, H. (2005). Osaamiskartoituksesta kehittämiseen. [From the competence survey to the development] Educa.
- Krippendorff, K. (2019). Content analysis: an introduction to its methodology (Fourth Edition.). SAGE.
- Kolb, A. Y. & Kolb, D. A. (2011). Experiential learning theory: A dynamic, holistic approach to management learning, education and development. In s. J. Armstrong & C. Fukami, (Eds.) *Handbook of management learning, education and development*. <https://doi.org/10.4135/9780857021038.n3>
- Markauskaite, L. & Goodyear, P. (2014). Professional work and knowledge. In S. Billet, C. Harteis & H. Gruber (Eds.), *International Handbook of Research in Professional and Practice-based Learning* (pp. 79-87). Springer.
- Mulder, M. (2012). Competence-based education and training. *The Journal of Agricultural Education and Extension*, 18(3), 305–314. <https://doi:10.1080/1389224X.2012.670048>.
- Mulder, M. & Winterton, J. (2017). Competence-based and competence-oriented vocational and professional education. In M. Mulder (Ed.), *Competence-based vocational and professional education: Bridging the word of work and education* (pp. 21-24). Springer.
- Mulder, M., Weigel, T. & Collins, K. (2007). The concept of competence in the development of vocational education and training in selected EU member states—a critical analysis. *Journal of Vocational Education and Training* 59(1), 65–85.
- Otala, I. (2008). Osaamispääoman johtamisesta kilpailuetu. [The competence gives a competitive edge] WSOY.
- Ritter, B. A., Small, E. E., Mortimer J. W., Doll, J. L. (2018). Designing Management Curriculum for Workplace Readiness: Developing Students' Soft Skills. *Journal of Management Education* 42(1), 80-103.
- Seery, N., Cauty, D., O'Connor, A., Buckley, J. & Doyle, A. (2016). Identifying, developing and grading 'soft skills' in design and technology education: a methodological approach. In Proceedings of the 32nd Pupils' Attitude Towards Technology (PATT) Conference, At Utrecht, Netherlands.
- Sorescu, A., Frambach, R., T., Singh, J., Rangaswamy, A., & Bridges, C. (2011). Innovations in Retail Business Models. *Journal of Retailing* 87(1), 3–16.
- Ström, S., Fischer, M. & Hourmouzis, C. (2018). *The Future of Automotive Retail*. The path towards mobility provider. Pricewaterhouse Coopers Germany.
- Väyrynen, V. (2012). Ilmailualan laadullisen ennakkoinnin selvitys. [Pre-analyses of professional competences in aviation section]. Finnair Flight Academy Oy, Technical training.
- Wisshak, S., Hochholding, S. (2020). Perceived instructional requirements of soft-skills trainers and hard-skills trainers. *The Journal of Workplace Learning* 32(6), 405-416.

Dr. Mikko Huhtala is Senior Lecturer in Craft, Design and Technology Education discipline at the University of Turku, Faculty of Education. His main research interests are learning outcomes in mathematics, anticipation and curriculum development. Dr. Huhtala has also educated as automotive engineer and has been educational specialist in various Finnish automotive central organizations and in Finnish National Agency for Education.

Dr. *Eila Lindfors* is currently Professor in Craft, Design and Technology Education discipline at the University of Turku, Faculty of Education. She is an experienced teacher educator and researcher, developer and evaluator of curricula and programs, and academic leader of university degree programmes as well as R&D projects. Her main research interests are innovation competencies, pedagogical innovation processes, STEAM-education and safe and secure learning and working environments in pedagogical contexts. Dr. Lindfors is the chair of the PATT38 conference.