# Superteam tournament

## A pedagogical innovation activity system

Laura-Maija Hero

**Publisher:** Metropolia University for Applied Sciences, Finland 2018
**Text, figures and layout:** Laura-Maija Hero
**Book cover graphics:** Antti Eerola
**ISBN 978-952-328-085-4 (pdf)**

**www.metropolia.fi/publications**
**www.metropolia.fi/julkaisut**

**Superteam tournament – A pedagogical innovation activity system**

**This publication is a summary of the Superteam innovation tournament model.** TeenMinno development project seeked solutions between vocational secondary and higher education where there is a threat of unemployment as well as opportunities for further studies. Development partners: Helsinki Metropolia University for Applied Sciences, Omnia, the Joint Authority of Education in Espoo Region and Futuretournaments Oy. TeenMINNO (Teiniminnotalkoot) was funded by European Social Fund during 2016-2018.



Elinkeino-, liikenne- ja ympäristökeskus
Vipuvoimaa EU:lta 2014–2020
Euroopan unioni
Euroopan sosiaalirahasto

**Superteam tournament - A pedagogical innovation activity system called TeenMINNO**

This book summarizes the Superteam model and functions as an introduction to the multidisciplinary and multi-grade innovation project aims as an opportunity to develop local innovation networks with different types of professional education institutions and local companies. Superteam Innovation tournament was piloted two times during 2017 in Finland with 26 teams.

**Introduction: The path from secondary vocational to higher vocational education and work life**

TeiniMINNO (ESF) project seeked a solution between vocational secondary and higher education where there is a threat of unemployment as well as opportunities for further studies. The solution was sought by bringing the secondary vocational and higher education students together to solve innovation challenges stemming from the labor market. Vocational secondary school students' transition to vocational higher education is significantly lower than those who studied in high school. The national economy would benefit if the secondary vocational students would continue their studies or get permanent jobs. Even more would the national economy benefit if the graduates would be more prepared for innovation and entrepreneurship.

TeenMINNO model produces those competencies that are needed in higher professional education, entrepreneurship and working life. The model facilitates a process of learning innovation - *learning what is not there yet* (Engeström 2014). Entrepreneurship also is important, but before it is advisable to start a business, you need a distinguishable service, product or a new way of doing something. This is why we have chosen innovation processes as the learning platform – to help our students find new opportunities and partners proactively through cooperation. Intrapreneurship is also important: organizations need proactive, independent, cooperative and enthusiastic developers in all organizational levels to solve today's difficult problems. TeenMINNO brings students under 25 years in secondary end-stage vocational education and training (VET, here a vocational college) to learn with higher education professional education students in UAS (university for applied sciences is a higher education institution). The younger vocational students are able to develop their social skills, self-esteem, proactiveness etc. competencies when they are heading for a professional career or moving from school to school. The participating SMEs or other organizations that provide innovation challenges get the student groups to solve current problems, create new products or services in the professionally facilitated process.

TeenMINNO model was developed in multidisciplinary teacher-producer community called Superteam TeacherForum. In total N=17 persons participated in the development process. Superteam Innovation tournament was piloted two times during 2017. In total N=26 multidisciplinary and multigrade teams of 5-6 students from VET and UAS participated in the tournament. As a project manager and a coach, I wish to express my warm thanks to all students, teachers and production staff members for the great development project and never-seen-before commitment to collaborate for innovation pedagogy. This publication summarizes the model and functions as an introduction to the multidisciplinary and multi-grade innovation project aims as an opportunity to develop local innovation networks with professional education institutions and local companies.

**Multidisciplinary thinking towards innovation competence**

Interdisciplinary curricula and multi-disciplinary education are at the heart of the strategies by which education institutions can train future oriented innovators. Learning for innovation does not only depend on cognitive processes but also on social interactions, participation in a community and other processes leading to a contemporary understanding of cognition as distributed and learning as essentially "contextualised" (Lave and Wenger, 1991; Duffy, 2009). Learners bringing their prior knowledge to the open, social and "never-experienced-before" multidisciplinary learning setting, where the target is to make an innovation. This requires deep understanding on innovation conception and process to direct the action towards a novel and usable solution. Multidisciplinary teams actively construct knowledge based on what they already know and believe (including misconceptions), but also creatively "living" the border terrain areas of their disciplines. While bringing together people from totally different industries and disciplines, new disciplines start to emerge. Who knows what disciplines are needed in the future?

Team members must explain their ideas more, they have to get along and create team spirit and innovation climate (Ekvall 1996) as they start to work together. In a competence tournament, students need to reflect upon their learning processes applying meta-cognitive strategies aligned with subject matter (Barrows, 1985; Bransford, Brown and Cocking, 2000; Sawyer, 2006, 2008) and prove their competence development in several ways and collect the proofs in team portfolios. The team portfolio is a web site that shows the innovation outcome and the team competence development process with evidence.

**Local area as an innovation ecosystem**

In TeenMINNO model, a the local innovation ecosystem (see e.g. Ylikoski, Ylikoski-Oksanen and Hero 2015), an activity system for learning (Engeström, 1987, 2014 see also Engeström 1999 for innovative work teams) is formed with local firms and their networks, students and their personal networks, educational institutions and innovation teacher pairs and their networks. Teachers negotiate with companies and other work life organizations to form open challenges for students. The local firms, secondary and higher vocational institutions and their students from different disciplines work together in multidisciplinary and multi-aged teams to develop innovations based on the open challenges. This quarantees that the innovation is optimally brought to the market place or for the benefit of the society together with the companies. It is important that the teams are as heterogeneous as possible. New ideas spring from collisions and "never-seen-before" -situations where the area of biggest risks but also the biggest opportunities is reached. Mixing the secondary vocational and higher vocational students has several benefits. This thinking is based on the assumption that the "Teens", i.e. the younger students aged 16-18 have more making skills and practical know-how. In the innovation process this is crucial e.g. in the prototype and go-to-market phases. The older students from UAS can have more responsibility, systems thinking, deeper content knowledge. So, the hypothesis is that these people complete each other not only in skills and knowledge, but also in orientation and independence towards work and joint action (see e.g. Rautkorpi and Hero 2017).

These young students are the potential future workers of the local companies. They can also be possible customers. But certainly they convey novel value to the local firms as a multidisciplinary team and a surprising combination of ideas and skills that approaches the problem at hand from outside the box of the company.

**Professional colleges and higher education institutions as innovation schools**

Everybody should have a democratic right to innovate and develop innovation competencies. Not just some technology or engineering fields. Innovation is not only important in technical fields, but also in wellbeing, culture, business and healthcare. Social innovations are nowadays important. To develop, society needs smart solutions, savings and new kinds of processes.

In TeenMINNO we think that vocational institutions should be more like multidisciplinary innovation centers than traditional discipline and classroom based schools. As we do not know what the future will hold for professions, we should educate more flexible, pro-active, creative and co-operative people. Still, the content knowledge is important, but also the knowledge of other disciplines help in finding future vocational paths. Innovation institution is born global and local, co-operative, supports multidisciplinary working and naturally co-operates with local companies and public organizations for new innovative solutions for the benefit of the society. These institutions do not have walls. They have open spaces where anybody is welcome.

These institutions would have organization structure that supports the innovation process as a learning environment. The institution strategy is designed to inspire innovation. The top management knows what supports innovation. The organization has named innovation teachers, who know what innovation competence is, knows the innovation process meta-level, knows how to build innovation climate and feel at home with multidisciplinary students. These teachers are inspirational, flexible and capable of organizing the ecosystem work. Their other foot is in the field still understanding the real life business and work life. The other foot is on meta-pedagogy where they assist the teams to succeed.

**Aim is to promote innovation competence**

While higher education plays an important role in providing people with skills for innovation (European Commission, 2011; 2012; 2017), a challenge is to develop a variety of innovation competencies simultaneously, in one whole project or other learning module. Learning experiences focused on innovation competence are needed as we are currently preparing students for jobs that do not yet exist, to use technologies that have not yet been invented, and to solve problems that we don't even know are problems yet. (Darling-Hammond, 2008) Problem based learning, for example, is designed to develop transferable skills along with the appropriate discipline specific knowledge that is learned in the same context in which it is used later on (Barrows, 1985; Bransford, Brown and Cocking, 2000; Donovan and Bransford, 2005). If innovation work would be the context, we would have to acknowledge that a discipline called innovation should exist. As innovation requires skills, knowledge, attitudes and even certain personal characteristics, it can be argued that a new discipline is not needed. Innovation repels discipline thinking, and leans on heterogeneous competencies and multidisciplinary thinking.

Innovation competence development is not easy to prove. In TeenMINNO, we use an individual innovation competence model developed in Turku University and Metropolia UAS (Hero, Lindfors and Taatila 2017, not a part of this project) that is a result of a systematic review combining ten years of research on innovation competence. (see figure 1.)

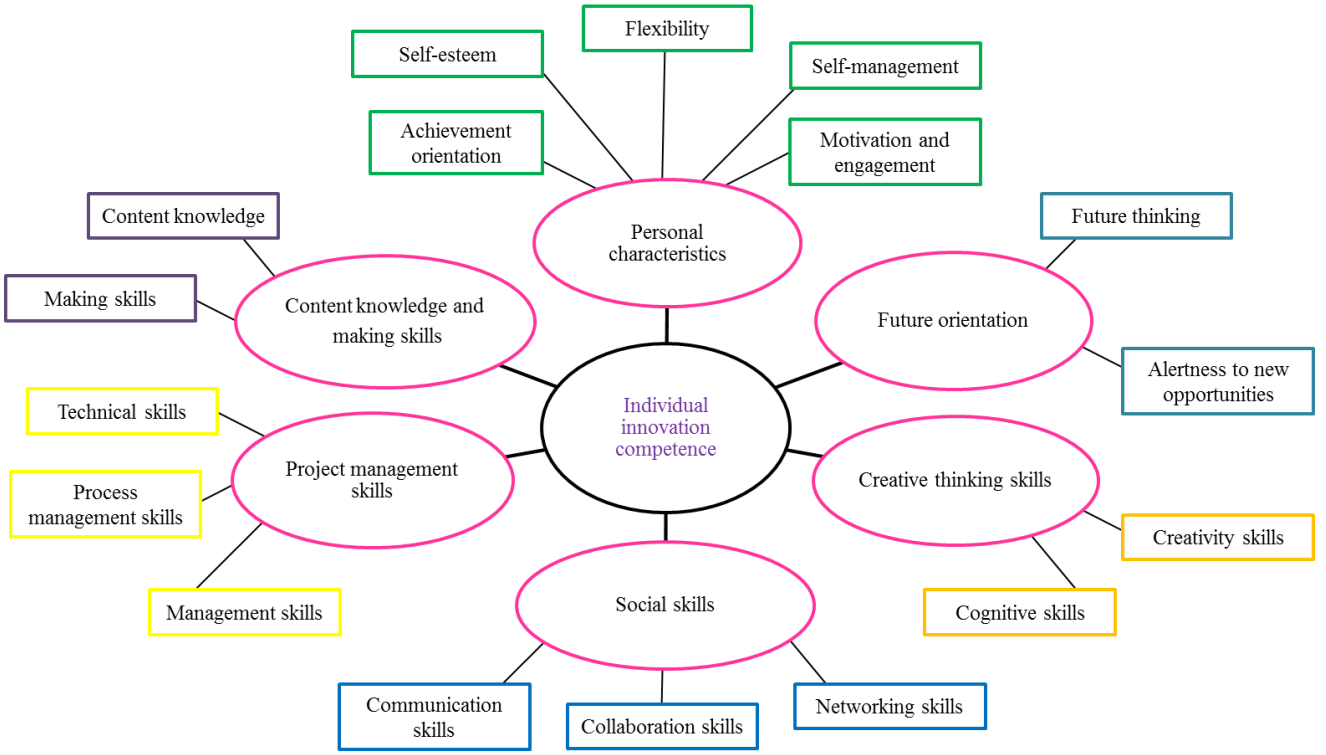


Figure 1. Individual innovation competence model for developing learning environments, pedagogical innovation processes and assessment methods. (Hero et al. 2017)

This model was applied in developing several assessment methods that teachers and teams can use as their tool to make their competence visible and prove their personal and team development in innovation competence. Peer-assessment methods are in the heart of the continuous multilevel assessment process that starts from the beginning of the Superteam innovation tournament, continues along the innovation process and ends in testing of the individual and team based assessment. One clever assessment method that we are piloting is “360 degrees” (e.g. Maylett & Riboldi 2007) where team members evaluate other team members and a member gets her own report from other team members. We also piloted pre- and post self-assessment surveys and “InnoCards” workshop method in the beginning, middle and end phases of the innovation process based on innovation competence model (Hero et al. 2017). These methods were very much liked by the students, and they will be developed further to implement in current professional education to be taken into use permanently.

**Superteam Tournament - Innovation competence for students and innovations for local firms**

TeenMINNO thinking springs from the realization that an innovation process is a brilliant learning environment. Firstly, internalizing the innovation process can help in later work life: Orientation towards finding problems and future opportunities, co-creation and co-ideation methods, taking creativity into use, making prototypes, testing them, taking novel solutions to the market place or for the benefit for the society or people. This type of process knowledge is important in any field of work. Secondly, innovation process as a project conducted by a multidisciplinary team can develop innovation competence both on individual and on team level. Thirdly, motivation for students comes from the authentic challenge from work life, but also from meeting people from other disciplines. We assumed that motivation and engagement will be even better, if the innovation competence development is transparent and understandable. Based on this thinking we decided to pilot Superteam Tournaments - innovation contests where students are not only competing of the best innovation, but also for best competence development of the team.

The most problematic to organize in an UAS is the multidisciplinary team work. The students from different disciplines should have joint time to work together. This is a technical matter of weekly scheduling. Based on our experiences in Metropolia UAS and the innovation projects 10 ECTS organized during 10 years, it requires management attention: the disciplines should decide joint time in before and clear the weekly schedules for multidisciplinary work.

Even more challenging is to set up collaboration between local vocational college or other institution, as the students are there often under-aged and do not have the same independent working skills, project management skills and they are used to classroom, teacher-led studying. Nevertheless, mixing secondary and tertiary has several opportunities. A team that is very heterogeneous might be more creative, find new solutions in the grey area different disciplines cross-sections. Younger students learn from older students, and they get to experience how UAS team project work functions and what it requires. They also get a certificate for 10 ECTS studies in UAS which might help later when applying for UAS. They also get a project work diploma to be attached to their CV:s. This might help in getting the next job as it proves that they can collaborate in a heterogenous team, they can produce novel solutions to real life problems and that they actually came up with a clever solution in practice. This tells about student creativity and proactiveness. This model was taken into use in Superteam innovation project pilots with 26 teams mixing secondary (VET) and tertiary (UAS) vocational students.

Superteam Tournaments uses hackathons (e.g. Briscoe & Mulligan, 2014) tradition as inspiration. Hackathons are short competitions, e.g. 48 hours or a weekend, where participating teams encode or otherwise develop a technical solution for an open challenge. Still, Superteam Tournament model differs from an average hackathon considerably: It is a long, intensive, full-day process with an aim to produce innovation competence, not only a novel solution, ie. artefact like product, service, or a process model for a company. The model (see figure 2.) was designed in a teacher forum consisting of 17 members from different disciplines from UAS and VET. The activity system development process is described in more detail in a study analyzing the tensions and solutions in the development work (Hero 2017).

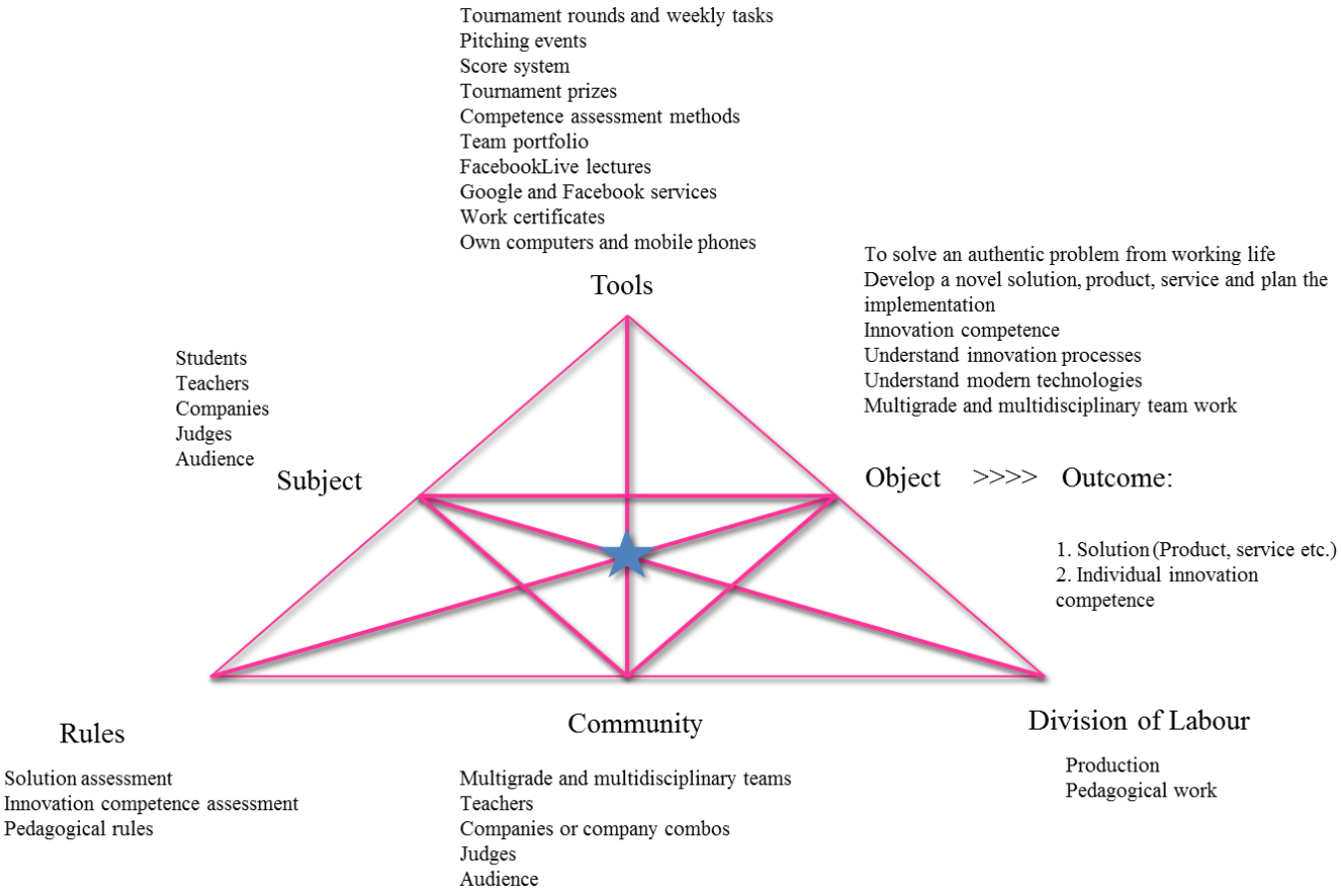


Figure 2. Innovation tournament as an activity system for multidisciplinary and multi-grade learning. (Hero 2017)

Superteam tournaments were piloted twice in 2017 as 7 week intensive processes. In total N=26 multidisciplinary and multi-grade student teams were formed. Every day 9 am to 4 pm is marked in 80 students time schedules. After orientation seminar about innovation, open challenges are given to students. In the first pilot we mixed high technologies such as virtual and augmented reality, robotics and wearable technologies to national theatre, sports equipment and wool yarn producer companies to present an unexpected open challenge for the student teams. Students could choose two different challenges and were chosen to either of them. Teams of five were formed mixing secondary and higher vocational students. Facilitated by teacher pairs, the teams participate in 5 different contest rounds: Idea, concept, prototype, testing and implementation rounds. During the rounds students develop, report, pitch, and develop further, but also test and show the competence development with different methods.

**The role of a teacher**

As the learners in TeenMINNO innovation processes are from different backgrounds, age groups and different educational levels, even carrying out different curricula, it is important to design the learning and teaching paths carefully. There are two positions on whether more or less instructional guidance during teaching is effective regarding learning and student achievement (e.g. Hmelo-Silver, Duncan and Chinn, 2007; Kirschner, Sweller and Clark, 2006; Mayer, 2004).

Firstly, in some views people learn and understand best when they can discover and construct knowledge for themselves in an unguided or minimally guided environment (e.g. Bruner, 1961; Duckworth, 2006). These student centered approaches such as discovery learning, problem-based learning, inquiry learning, experiential learning and constructivist learning account for such minimal direct guidance. For innovation, the direct guidance represents itself in different form than knowledge transfer. The role of the instructor is crucial, but not a guiding role. The instructor is a tutor that facilitates the process, helps the innovation climate grow, makes sure there is enough coffee and bisquits, helps the participating companies realize their challenges, and the student innovations are communicated and celebrated in the end. The teacher is also a translator of learning. He or she helps students to see their competence development.

Secondly, in some views (novice) learners should be provided with direct instructional guidance on the concepts and procedures. Direct instructional guidance means providing information that fully explains the concepts and procedures that students are required to learn as well as learning strategy support that is compatible with human cognitive architecture. (Kirschner, Sweller and Clark, 2006). In innovation pedagogy and competence thinking in TeenMINNO, we postulate that the direct guidance can concern the innovation process and competence target that are made transparent for students. The students in all levels of vocational education can discover and construct knowledge in minimally guided environment if the team is mixed from higher education and secondary education students and if the target, i.e. innovation is conceptually clear, the targeted competence factors understandable and the innovation process as a step-by-step model clear. This meta-level knowledge is simple enough to be understood at least from our experience from 16 years up. Teachers role is more to facilitate the process, help in solving team management problems, organize the activity system and to support those who have challenges in independently collaborate in the team. Teachers responsibility is to quarantee, that all students get their work and study certificates in time, that the marks are given. The main difference to other types of teaching is that the teachers together create and plan the activity system in before and collaborate in creating such pedagogies that help students in grouping, creative work, concepting, making a proto, planning competitive marketing and launch activities, and finally “pressure test” entrepreneurship based on the team composition, interest and by weighting the possibilities of the product or service to become a product family.

**TeenMINNO provides a co-innovation model for local companies and students**

The TeenMINNO model is a competition and a facilitated pedagogic process for students aiming at developing their innovation competence. In TeenMINNO, real companies get real innovation challenges solved by students for free. The Finnish vocational institutions in mid- and higher education, which are a part of the Finnish world-class education, work together in the TeenMINNO process. TeenMINNO thinking stems from an innovation tradition and pedagogy developed in Metropolia UAS: MINNO® Innovation project. An innovation project worth 10 ECTS is implemented in every students’ curriculum. There 16000 students in Metropolia, so the local and area wide development potential is huge. The MINNO® idea is that when an

engineer gets together with a culture producer and alaborant meets a musician, a new, unique way of thinking is born. Having success in business requires unique thinking. The TeenMINNO model offers both the students and the companies exactly that opportunity, says Laura-Maija Hero, the project manager of TeenMINNO. TeenMINNO is funded by ESF (European Social Fund) during 2016 - 2018.

For further information, please contact:
Senior lecturer, Project Manager and innovation teacher
Laura-Maija Hero,
Metropolia University of Applied Sciences
+358 40 179 1409
laura-maija.hero@metropolia.fi

TeenMINNO (ESF): http://www.metropolia.fi/teiniminno
See slides >>

## References

Barrows, H.S. (1985). How to Design a Problem-Based Curriculum for Preclinical Years, Springer-Verlag New York, NY.

Briscoe, G., & Mulligan, C. (2014). Digital innovation: The hackathon phenomenon. London: Creativeworks London Work Paper, 6.

Bruner, J.S. (1961). The art of discovery. Harvard Educational Review, Vol. 31, 21-32.

Darling-Hammond, L. (2008). Introduction: Teaching and learning for understanding in L. Darling- Hammond, B. Barron, P.D. Pearson, A.H. Schoenfeld, E.K. Stage, T.D. Zimmerman, G.N.

Duckworth, E.R. (2006). The Having of Wonderful Ideas and Other Essays on Teaching and Learning (3rd edition), Teachers College Press, New York.

Duffy, T.M. (2009). Building lines of communication and a research agenda, in S. Tobias and T.M. Duffy (eds.), Constructivist Instruction: Success or Failure? Routledge, New York, 351-367.

Ekvall, G. (1996). Organizational climate for creativity and innovation. European Journal of Work and Organizational Psychology. Vol 5(1).

Engeström, Y. (1987). Learning by expanding: An activity theoretical approach to developmental research. Helsinki: Orienta-Konsultit Oy.

Engeström, Y. (1999). Innovative learning in work teams: Analyzing cycles of knowledge creation in practice. In Y. Engeström, R. Miettinen, & R.-L. Punamaki (Eds.), Perspectives on activity theory (pp. 377–404). Cambridge, UK: Cambridge University Press.

Engeström, Y. (2014). Learning by expanding: An activity-theoretical approach to developmental research. Cambridge, UK: Cambridge University Press.

European Commission. (2017). Communication from the commission to the European parliament, the Council, the European economic and social committee and the Committee of the regions on a renewed EU agenda for higher education. Retrieved from https://ec.europa.eu/education/sites/education/files/he-com-2017-247_en.pdf Accessed 25.8.2017.

European Commission. (2012). Rethinking education: Investing in skills for better socio-economic outcomes. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0669&from=FR. Accessed 13.03.16.

European Commission (2011). Progress Towards the Common European Objectives in Education and Training. Indicators and Benchmarks 2010/11, Commission staff working document, http://ec.europa.eu/education/lifelong-learning-policy/doc/report10/report_en.pdf. Accessed 25.8.2017.

Hero, Laura-Maija (2017). Innovation tournament as a multidisciplinary activity system to promote the development of innovation competence. Journal of Professional and Vocational Education, 19(4), 8-31.

Hero, L.-M., Lindfors, E. & Taatila, V. (2017). Individual Innovation Competence: A Systematic Review and Future Research Agenda. International Journal of Higher Education, 6(5), 103-121. Doi: https://doi.org/10.5430/ijhe.v6n5p103

Hmelo-Silver, C.E., R.G. Duncan and C.A. Chinn (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). Educational Psychologist, Vol. 42(2), 99-107.

Kirschner, P.A., J. Sweller and R.E. Clark (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. Educational Psychologist, Vol. 41(2), 75-86.

Lave, J. and E. Wenger (1991), Situated Learning: Legitimate Peripheral Participation, Cambridge. University Press, New York.

Mayer, R.E. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. American Psychologist, Vol. 59(1), 14-19.

Maylett, T. M., & Riboldi, J. (2007). Using 360° Feedback to Predict Performance. Training + Development, September, 48–52.

MINNO® Innovation pedagogy: http://www.metropolia.fi/en/services/innovation-projects/ Accessed 23.2.2018.

Sawyer, R. K. (2006). Introduction: The new science of learning. In R. K. Sawyer (ed.), The Cambridge handbook of the learning sciences, 1-16. New York: Cambridge University Press.

Rautkorpi, T. and Hero, L.-M. (2017). Promoting students' reflections in organisational improvisation arrangement between higher education and workplaces. Nordic Journal of Vocational Education and Training, 7(1), 1-22, ISSN 2242-458X http://dx.doi.org/10.3384/njvet.2242-458X.17711

Sawyer, R. K. (2008). Optimising learning: Implications of learning sciences research. Presentation held at the OECD/CERI International Conference "Learning in the 21st Century: Research, Innovation and Policy," http://www.oecd.org/dataoecd/14/9/40805146.pdf

Ylikoski, Teemu; Oksanen-Ylikoski, Elina; Hero, Laura-Maija (2015): Educational Organizations as Co-Developers in the Helsinki Region. In Orchestrating Regional Innovation Ecosystems (eds. Lappalainen, Pia; Markkula, Markku; Kune, Hank. Electronic book ISBN 978-952-60-3702-8. Accessed 2.3.2018.

## Frequently asked questions concerning innovation projects

**Q: What does the concept "Innovation" mean in Metropolia University for applied sciences/ Finland?**

*A: An innovation is a novel and innovative solution to a real problem that is made concrete and that is tested, piloted or taken to market (or otherwise for the benefit of the society and people) to create value. An idea is not an innovation, it has to be made real.*

**Q: That is a very ambitious definition! Is it really possible that students together with companies actually make innovations?**

*A: The definition does not state weather the innovation has to be radical. Small incremental innovations are important: they create value in real life quickly and change thing for better more agile. The end result is emphasized as the target, but learning actually happens during the process. And learning is the goal, it is important that the students know how the innovation process works to be able to innovate when entering the work life. So, the process and learning in it is assessed, not the end result. We democratically think, that every student is entitled to develop his/ her innovation competence.*

**Q: Why innovation?**

*A: Innovation process has proved to be an ideal learning platform. Innovation process is facilitated so that innovation competencies are potentially developed. During the process you can learn new knowledge, skills, attitude and behavior in an authentic context that requires learning orientation, efficient team work, networking, research and development methods, project management and many kinds of digital communications skills. Innovation competencies, such as futures' thinking, creativity, social competencies, many kinds of communication, project management, and cognitive competencies are crucial as we do not know what the future of these students will be like.*

**Q: What kinds of innovation projects do you do in Metropolia?**

*A: Most of the innovation projects are multidisciplinary: students from different disciplines form teams and they find or are given an authentic problem from work life. For example in Culture and wellbeing sector 99% of the innovation projects are multidisciplinary. Some are larger and longer, some more technical product innovations, some solutions for social problems. Some are process innovations, some service innovations. (MINNO® Innovation projects)*

**Are you interested in multidisciplinary and multi-grade innovation learning? This booklet is a summary of the Superteam Innovation tournament model.** The model has been developed in TeenMinno-project. TeenMinno seeked solutions between vocational secondary and higher education where there is a threat of unemployment as well as opportunities for further studies.

The solution is sought by bringing the secondary vocational and higher education students together to solve innovation challenges stemming from the labor market. In Finland, vocational student's transition to higher vocational education is significantly lower than those who graduated from high school. The main novelty value of TeenMINNO is the new Superteam innovation tournament activity model to support secondary and tertiary vocational path. The model focuses on the multi-grade and multidisciplinary collaboration and innovation challenges that stem from work life.

In TeenMinno project the main target group was less than 25-years-old vocational education students in transition from school to school or work. The emphasis was on developing professional role taking and strengthening of the proactive professional identity in multi-professional context. Development partners were Helsinki Metropolia University for Applied Sciences, Omnia, the Joint Authority of Education in Espoo Region and Futuretournaments Oy. TeenMINNO was funded By European Social Fund during 2016-2018.