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Arkko-Saukkonen, A., Krastina, A. & Miettinen, S. (2020). Enhancing Arctic creative business and learning through cross-border collaboration—Designing the Creative Steps 2.0 authentic learning environment. Teoksessa L. Heininen, H. Exner-Pirot & J. Barnes (toim.), *Arctic yearbook 2020* (s. 219–241). The Thematic Network (TN) on Geopolitics and Security of the University of the Arctic. https://arcticyearbook.com/images/yearbook/2020/Scholarly-Papers/11_Arkko-Saukkonen_et_al.pdf

Enhancing Arctic Creative Business and Learning through Cross-border Collaboration—Designing the Creative Steps 2.0 Authentic Learning Environment

Anitra Arkko-Saukkonen, Anzelika Krastina & Satu Miettinen

Arctic companies are located in rural and sparsely populated areas where long distances are a common feature. Innovations and development collaboration could offer Arctic companies the possibility to widen their potential business. Digitalisation can enable companies to expand their operations and collaborations in a sustainable way. The University of Applied Sciences should take responsibility for the mutual research, development and innovation activities of companies and students, where integration of collaborative work can benefit development of companies and simultaneously provide learning opportunities for students. Such integration responds to changes in society in terms of education and regional development.

In the area of design research, we present how Creative Steps 2.0 has been redeveloped into an authentic learning environment where Arctic creative business is matched with another business and where students provide innovation and development assistance for companies in cross-border collaboration. We looked at the functionality of an authentic learning environment and the benefits for companies. Authentic learning is the framework for the study and has a strong impact on strengthening working life skills. In the development phase, companies brought perspectives to support the development of the authentic learning environment through co-design. The data were collected with a mixed methods approach and analysed with a formative and content analysis.

Participation brought the benefits from perspectives, creating a network and ideas that could later be used. However, the final concept was not notable, and companies were critical of the outcomes. The importance of the international network was the most significant factor among the companies.

Introduction

The Arctic region has many notable features: its fragile environment, cold climate, sparsely populated areas, isolated communities, long distances, and limited infrastructure. It also experiences the direct effects of climate change, so there is a pressing need to create sustainable change that can meet the challenges of the region (Arctic Center, 2020). The Arctic region requirements are reflected in the operating environment for businesses and also in the development of education, which must respond to changes in the region.

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The Lapland University Consortium (LUC) relies on Arctic global responsibility in its operations in an effort to support and develop the region's operating conditions and expertise. Lapland University of Applied Sciences (LaplandUAS), as a part of LUC, contributes to working life and regional development (Lapland UAS, 2020) through R&D activities while also playing a key role in providing professional higher education in Lapland. The development of education encourages global responsibility and, at the same time, distance management, not only regionally but also internationally. According to Heikkinen and Kukkonen (2019: 272), the University of Applied Sciences (UAS) produces an 'understanding of working life, society, at the same time one should and desire to make things better' and does not leave regional development activities too narrow a sector but instead engages responsible solutions. Although economically dominated by extracting and heavy industries, there is increasing interest in economic diversification in the Arctic. To change the economic activity structure into one that is more resilient to current climate changes in the Arctic and ensure sustainable development in the region, one solution may be an increased capacity for innovation, entrepreneurship, and creative thinking.

Digitalisation has brought opportunities for Arctic actors to operate in the global world. Through communication and interaction, the operating environment has expanded across national borders (Fidler, 2016: 7). Indeed, globalisation has been redefined through digital infrastructure (Raspotnik & Steinicke, 2017). Here, the activities of higher education institutions, along with companies and the online interactions of companies, can enable the development of products and services when the common space of activities is organised online. Education must formulate forms of action to support innovation and development work through online interaction.

Authentic learning (AL) can create a link between the development of working life skills and the challenges arising from working life, where learning and collaboration are at the centre. Lombardi (2007: 10) has noted, 'Authentic learning may be more important than ever in a rapidly changing world, where the half-life of information is short and individuals can expect to progress through multiple careers.' The nature of changing work and changes in society requires training to develop learning and collaboration solutions and thus competences for lifelong learning in relation to needs (D2L, 2018). Hussin (2018) shows that through Education 4.0, education can be involved in changing the environment by building new creative learning solutions that help meet the needs of society and the Industrial Revolution 4.0 (Fisk, 2017). In addition to personal flexibility, the skills required for teamwork and increasing internationality are made possible through collaborative networking, which can be practised through joint projects and complex world situations that require problem solving and 'transversal skills' (Fidler, 2016: 4-14; World Economic Forum, 2016: 10).

The practical development work related to our research and education in general is based on this framework of the operating environment of the Arctic region, its changing society, and the related development needs. Here, the background is the EU-funded Creative Momentum project (2015-2018), which has supported creative companies through internationalisation, networking, and competence development (MyCreativeEdge, 2020). The Creative Momentum project targeted creative entrepreneurs in the Arctic and northern periphery, for whom the project aimed to support internationalisation and business opportunities.

The current study is based on design research (DR), and we follow the iterative nature typical of design research (McKenney & Reeves, 2019; Plomp, 2010; Nieveen, 2010). In fact, DR is often

used as a method for developing complex problems in education. Therefore, it is a natural way to approach our subject, and the various phases of development work play a significant role. The phases are elaborated in detail in the study, which helps to create a picture of the entire development process. This study is part of a broader design research that iteratively develops an authentic learning environment. The first Creative Steps (CS) pilot has been reported previously, and its results serve as a starting point for this development work (Arkko-Saukkonen, 2017; Arkko-Saukkonen & Merivirta, 2013). In the present article, the development work focuses on the second iteration of DR. In the current study, an authentic learning environment (AuLE) is designed as a Creative Steps 2.0 (CS2.0) model. We test it among Arctic creative entrepreneurs and students during innovative development work, in which companies develop a common product or service. Finally, we map out the benefits for entrepreneurs during cross-border collaboration and highlight the identified areas for development through the companies' experiences.

The theoretical basis for the current study has been built in previous research (Arkko-Saukkonen, 2017); here, we focus on the framework for authentic learning (AL) (Herrington, Oliver & Reeves, 2010). The identifiable features of AL are based on real-life complex tasks that can be solved collaboratively, multi-disciplinarily, and multiculturally (Herrington et al., 2010; Leppisaari et al., 2011; Teräs & Herrington, 2014) and in which the importance of 'high-level thinking' and 'analysis' is emphasised (Lombardi, 2007). Real-life conditions offer good opportunities to transfer skills to working life smoothly (Kartoglu et al., 2017). An online solution built through authenticity also produces an effective way of learning (Parker, Maor & Herrington, 2013).

It seems that DR provides a good approach, especially for the development of innovative technology-based educational solutions (Herrington et al., 2010; Parker 2011; Korhonen, Ruhalahti, & Veermans, 2019). The focus of the current study is on companies because the benefits for companies often receive less attention in work-based learning when designing solutions. Indeed, our research fills that gap by designing an AuLE, in which, in addition to students, companies play an active role. This is done by utilising co-design in development work (Sanders & Stappers, 2008), which involves companies bringing perspectives to AuLE development.

The research is based on a socio-constructivist conception of learning, with an emphasis on social interaction among community members. The observation of an individual's reality takes place holistically through a sociocultural frame of reference, in which knowledge and skills are shaped according to the picture of the times (Siljander, 2014: 232). When considering the development of AuLE, collaborative interaction plays an important role in the joint activities of various participants including companies, students, and external experts. Lave and Wenger (1991) present the idea of a 'community of practice', in which learning takes place between the individual and the community and the individual takes on an active role in the community as his or her competence grows.

In the current article, the following research questions guided the review and analysis of content according to the phases of DR:

1. Which design points could be identified from the companies, through co-design, that can be used to develop the CS2.0 authentic learning environment?
2. How can the developed CS2.0 be further developed and refined to support Arctic companies?
3. What benefits do the companies receive during implementation, and what are the identified challenges?

Exploration of theoretical framework

Authentic learning environment

A learning environment (LE) can be broadly understood as any resource that includes physical or virtual spaces, functions, or interactive processes that contribute to learning. An LE offers an alternative to traditional teacher-led learning (Helakorpi, 2017). The LE of the UAS, which is implemented in the context of RDI activities by integrating teaching into working life cooperation, is called an integrative LE, which is characterised by exploratory and developmental learning, 'learning by developing' (Komonen, 2007; Poikela, 2009; Fränti & Pirinen, 2005). During creative development activities, doing becomes the core of collaboration. In the case of an LE that supports creative activity, it is necessary to decide on the key features that will move the joint work and learning in the RDI activities forward, especially when working internationally on a development task, as is the case with our research. Huang (2020: 10) points out that 'a positive, attractive and supportive environment' should be created to inspire creativity.

Online solutions provide an alternative way to conduct interactive learning. It should be noted that interaction is an essential component of any LE (Woo & Reeves, 2007). Web 2.0 and social media platforms have also been used as LEs (El Mhouti et al., 2016). Engeström (2009) focuses on 'learning activities', which are 'socio-cognitive processes and states', pointing out that for community learning, action can be conveyed through new tools and brands, in which digital technology can play a significant role. Mäkelä et al. (2014) see the LE as a psychosocial and physical environment whose characteristics are divided into three dimensions, including 'general well-being, learning situation and learning tools and spaces'. An earlier study found that network collaboration requires flexibility and patience because technical challenges often make joint operations more difficult (Arkko-Saukkonen, 2017).

In the current research, the AuLE is built on a multilevel model, at the core of which is an action-guiding method through which new creative thinking is pursued through collaborative online interaction. In this case, the LE is understood as a process-like AuLE and named the Creative Steps 2.0 model (CS2.0). It relies on the AL framework. The companies are provided a development environment during the collaboration. The aim is to innovatively develop new product and service concepts common to the two companies through innovation activities while the participants practice their working life skills using a step-by-step method that supports creative activities. Helakorpi (2017) sees an LE's network solutions in two directions, product-centric and process-centric, where the construction of community and interactive knowledge takes place during learning-supporting processes. A process focus resonates with the model that is being developed in the present study.

The elements of authentic learning presented by Herrington et al. (2010) are suggested as a basis for planning, focusing here on targeting the shape of the LE as a place to support AL for students. Herrington et al. (2010) emphasise that true AL is possible by considering all nine AL elements:

1. *Authentic context*
2. *Authentic tasks*
3. *Access to experts and the modeling of the process*
4. *Multiple roles and perspectives*

5. Collaborative construction of knowledge

6. Reflection

7. Articulation

8. Coaching and scaffolding

9. Authentic assessment

Our research in AuLE design relies on all key elements of AL in the context of development. From the perspective of the involvement of entrepreneurs, special attention is paid to the context of learning and the tasks that guide what is done during the process. In addition, collaborative work, which takes place through reflection and social interaction, becomes a key driving factor in terms of leading an activity toward a goal-oriented outcome and its evaluation. According to Kartoglu et al. (2017: 2250), 'decision-making, improved contingency planning, increased self-confidence and trust in one's ability to perform new tasks, as well as a strengthened professional identity' were strengthened through authentic action. Hence, AL clearly supports general working life skills.

It is hoped that learning will take place not only for students but also for entrepreneurs by adopting learning into the practical everyday life of their own business. For creative entrepreneurs, social capital can increase through 'learning by doing', in addition to 'learning from others', which Murtagh and Collins (2017) have observed by interviewing creative entrepreneurs; they highlight the fact that 'social capital' cannot be forgotten if efforts are made 'to facilitate the growth of creative capital in support of creative entrepreneurship' (Murtagh & Collins, 2017). The context and authentic tasks of the activity, general opportunities for action and potential challenges or obstacles should be mapped out in collaborative work based on the needs of the employees' working life to prepare to overcome difficult situations.

Collaborative act of creativity by co-design

A collaborative approach in design has become mainstream in recent decades. The idea of collaboration is tied to the notion of working together for a joint or common goal and achieving more together than on one's own. This may be a co-creative activity, which can refer to any collaborative act of creativity. When cocreation is discussed in the context of business, marketing, and the creation of experiences, Prahalad and Ramaswamy (2002, 2004) are usually mentioned. They discuss the fact that the inclusion of people can help in discovering and identifying unique value offerings. Designers and any user or stakeholder can also collaborate to promote design work. Sanders and Stappers (2008) present a classical image, 'new landscapes of design', which positions various design approaches in relation to users as design partners and users as objects. The trend has been to share power with the users and collaborate with them during the design process to better identify their needs in an everyday use context.

Service design builds on this collaboration with users and stakeholders and the interactions among them; it embeds the human-centred approach, focusing on institutional structures and how service offerings are organised through service journeys. This is called the outside–in approach, in which the organisation is forced to consider how their services appear from the user's point of view. Service design can be used in the context of education in various ways: it can help in curriculum

development (Kuzmina et al., 2012) and the development of learning networks (Carvalho & Goodyear, 2018).

In our study, we identified a large number of design challenges in which the development of an LE must take into account not only learning but also the companies and joint product and service development. Herrington et al. (2010) recommend DR as a strategic choice for the development of AL, specifically in support of AL key research problems arising from a complex field of education, through step-by-step progression.

Analysis of a practical problem and previous model

Background of the Arctic region and education needs

Educational institutions must play a central role in boosting innovation and entrepreneurship competence to ensure prosperous, sustainable Arctic community development. According to Drucker (2015: 25), 'innovation is a specific tool of entrepreneurs and is the means by which they exploit change as an opportunity for value creation'. To diversify the economic structure and create a sustainable future, there is a need to create incentives for more systematic entrepreneurship. An educational institution that plays the role of an enabler of innovative mindsets must also approach the problem from an angle that is different from that of the traditional method of academic training. The most important factor is to provide a form of training that meets the specific needs of a region, such as the Arctic region.

The AuLE creation of CS2.0 at Lapland UAS was a response to a described need to boost existing and emerging entrepreneurship through more efficient innovation training that would serve multiple goals, including the integration of real-life situations in the classroom by connecting students and entrepreneurs. Further, this training would help entrepreneurs, especially small businesses, innovate their businesses through a systematic step-by-step approach and input from the students involved and bring the collaboration into a digital mode that would enable collaboration across the borders in a sustainable manner.

The first prototype of the Creative Steps (CS) model was developed and iterated in the context of the Creative Edge project (2013). The first prototype of the CS model was designed to support companies' innovative development work, focusing on students' ability to develop skills and help them network with international actors as future experts. The focus was on students and strengthening their competence (Arkko-Saukkonen & Merivirta, 2013; Creative Edge, 2013). Previous research results show that the CS model is a functional environment that supports joint innovation, enabling the transfer of knowledge and technology between participants through online interactive collaboration. The results of the first iteration of CS highlighted the need to focus on improving online interaction and allowing freer choices in the use of online tools; the role of the companies should be further strengthened (Arkko-Saukkonen, 2017).

In the second iteration, the focus of the CS2.0 model shifted to supporting businesses and, at the same time, strengthening student learning through authenticity. McKenney and Reeves (2019: 99) point out that in educational development work, the research orientation phase and planning take into account what do we want to know about the problem, the context, and stakeholder needs. Because the focus and objectives clearly changed, a new prototype had to be designed, the development phases of which, from the co-design to a new prototype, will be presented below.

Design research as an approach to designing an authentic learning environment

The current study was carried out in accordance with the operating principles of DR (McKenney & Reeves, 2019; Plomp, 2010; Nieveen, 2010). The data consist of qualitative and quantitative data, but the emphasis is on the qualitative data, which was supplemented by the quantitative data. The study follows the structure of DR: analysis/exploration, design/construction, evaluation/reflection, and finally, intervention/theoretical understanding (McKenney & Reeves, 2019: 83). The last phase usually takes place after an understanding can be produced by all the iterations. Oliver, Herrington, Herrington, and Reeves (2007: 18) point out that high-level research can be seen in learning design when the process description is performed by accurately pointing out the parts of the activity, and Falconer et al. (2007: 4) use the phrase 'in the form of a runnable description'. Therefore, the development of the AuLE presented in the current article is described in phases.

Design research is iterative in nature and known by several names, such as design-based research, development research, and design experiments (van den Akker, 1999), and the DR family includes educational DR (McKenney & Reeves, 2019), which describes the approach to education in more detail. In our research, we adhere to the concept of DR. This approach is characterised by the development of a practical object in a collaboration between researchers and participants. It is known as 'a twofold yield' because its central feature promotes practical development, along with the development of theory (McKenney & Reeves, 2019; Plomp & Nieveen, 2013).

This DR strategy was considered appropriate to guide this particular research context primarily because there was 'a complex educational problem' that had to be addressed in a way that would have potential for high-level 'practical impact and relevance' (Plomp, 2010; Anderson & Shattuck, 2012). Similarly, Kelly (2010) points out that this type of research method is appropriate when 'open, or more appropriately, wicked problems' are at hand. In our study, we identified a large number of design challenges in that the development of an LE must take into account not only learning but companies that encounter joint product and service development (Figure 1).

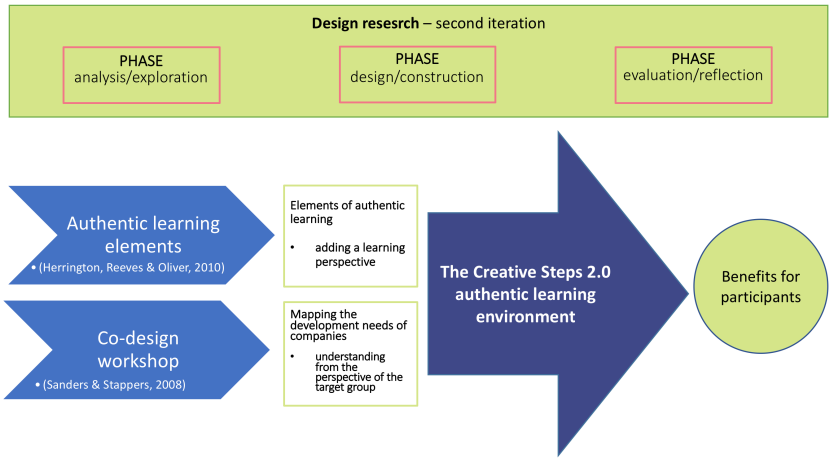

Figure 1. Conducting the second iteration of the development of the Creative Steps 2.0 by design research

Conducting the study

As with DR, the development and testing phase is presented in the order in which the development work progressed, describing the context, participants, and data collected, as well as the results in connection with the various phases. Research questions are raised in connection with the development phase. The first two authors of the article acted as developers and, during the implementations, as coaches. The third author brought expertise to underpin the co-design experience. The first author was responsible for collecting and analysing the material. The second author went through the analysed material and made observations to correct the analysis. In connection with the collection of data, the participants were asked for permission to develop and research the method in accordance with ethical principles.

Co-designing with Arctic companies

Analysis and findings from co-designing phase

By answering the research question – *Which design points could be identified from the companies through co-design, and which are used to develop the Creative Steps 2.0 authentic learning environment?* According to Plomp (2010: 26), a formative analysis should analyse the various phases of DR and state the functionality of the planned content in its context, thus evaluating the whole from the perspective of the target group.

In the co-design phase, entrepreneurs were considered one of the target groups, and companies in the creative field were invited to the co-design workshop in Lapland, Finland. Fourteen (n=14) participants from different sectors of the creative industry were involved in the workshop taking place at the Lapland UAS Rovaniemi campus in Spring 2016. Images and visual material from the work of the co-design workshop were collected during the joint work. A formative analysis was used. Design action points were identified for development work, through which a model of an AuLE was developed. This material reflects the needs and perspectives of companies.

The 'FiveStars' tool, developed for the co-design workshop, sought the views of companies on key issues for development (Table 3) (Arkko-Saukkonen & Krastina, 2016: 16-21). In addition, a 'journey map' was sketched to describe the step-by-step model that guided the activity; entrepreneurs had the opportunity to bring visual perspectives to areas that disappeared as important steps in the company's creative development activities.

☆ encountering companies internationally
☆ the role of the student as part of the process
☆ a challenge through which the development task can be formed as a basis for work
☆ the possibility of the entrepreneur using time in the process
☆ online work experience and ideas for online tools
And which stages of the process would be most important for entrepreneurs to participate

Table 3. Business perspectives were discovered from the 'FiveStars' themes.

The co-design workshop provided an understanding of companies' attitudes and perspectives for interactive collaboration and action aimed at an AuLE (Image 1). All five aspects of the 'FiveStars' tool were important. As a result and as a guide for further development, the most important observation was that the challenges of creative entrepreneurs vary greatly, depending on the type of company in question, because there were several types of creative companies involved.

Image 1. An example of the collected material to be analysed.

The opportunity for interaction and co-design must be created through versatile methods and easy-to-use online tools that support the work (Figure 2). It is important for companies to be involved in interaction and joint work because the results showed that entrepreneurs were interested in participating in several steps of the creative process, which they marked on the 'journey map' that described the process.

Figure 2. Design action points show the results of the co-design workshop.

Designing and constructing the prototype of the Creative Steps 2.0 model

Analysis and findings from developing the authentic learning environment model

By answering the research question - *How can the developed CS2.0 be further developed and refined to support Arctic companies?* - the AuLE was designed by relying on authenticity at each level of activity,

as presented by Reeves et al. (2002). Through a step-by-step method, the process activity was guided (Figure 3) by taking the task that requires creative work and developing it step-by-step toward the end result (Arkko-Saukkonen & Krastina, 2018).

Figure 3. Step-by-step methodology in the Creative Steps 2.0

In the redesigned AuLE of CS2.0, all the elements attached to it adhere to authenticity and assimilate to real-life complex tasks, and collaborative interaction takes place internationally between students and companies, here based on the support of external experts. Interaction with working life and the promotion of the creative process are made possible with the support of coaches. The reformulated CS2.0 model of the AuLE can be seen as clearly aligning with the elements of AL presented by Herrington et al. (2010) (Table 4).

Creative Steps 2.0 authentic learning environments' action steps in relation to authentic learning elements		
	Step-by-step methodology in the Creative Steps 2.0 *(Arkko-Saukkonen & Krastina, 2018)* **Step 0:** Framework of a business case **Step 1:** Identifying the business case **Step 2:** Enabling online tools **Step 3:** Understanding the business case **Step 4:** Formulating a potential business idea **Step 5:** Idea evaluation checkpoint **Step 6:** Enhancing business expertise **Step 7:** Creative clinc **Step 8:** Business idea prototyping **Step 9:** Proving market demand **Steps 10:** Pitching	**Authentic learning elements** *(Herrington et al., 2010)* 1. Authentic context 2. Authentic tasks 3. Access to expert and the modeling of the process 4. Multiple roles and perspectives 5. Collaborative construction of knowledge 6. Reflection 7. Articulation 8. Coaching and scaffolding 9. Authentic assessment
STEP 0	Authenticity is taking place immediately upon starting work. The assignment is ill-defined and is built at the beginning of the work from a framework that comes from the interaction between companies and students using a 10-question method. This is created together with the first step of the step-by-step method (step 0), where the first encounter between students and entrepreneurs takes place. • Creative teams are formed with two companies and students. • Interactive activities are needed to start work, creating a basis for all the work, • The joint mandate is built through interaction and dialogue as a framework. • The development needs and field of activity of both companies are taken into account in the framework.	⇒ in relation to authentic learning elements 1-5
STEPS 1-10	Based on the information received, the students can structure a joint assignment (step 1) for the two businesses, which is accepted by the businesses. Online work is made possible by guiding collaborative tools and online working principles to the participants (step 3). The subtasks placed in the different steps (steps 2–7) guide the process towards the prototype to be built from the creative activity (step 8), moving towards validation (step 9) and the final concept (step 10). • The whole process requires interaction, collaborative action via the web and the use of online tools, but at the same time, it also requires independent information retrieval and structuring. • Learning is made possible in interaction situations. • Learning is also taken to other spaces and expanded thinking in alternative ways (step 6), for example, events, seminars, content from the Internet, through various sources and videos, or through other self-selected sources of information. • The 'Creative Clinic' is one learning space (step 7) where external experts can spar and comment on the intermediate stage of the work.	⇒ in relation to authentic learning elements 1, 2, 3, 5

Table 4. Authentic learning environments' action steps in relation to authentic learning elements (Herrington et al., 2010).

STEPS 0-10	Students practice their professional skills by taking on an expert role in a multidisciplinary team and bring their own strengths to the group while learning from others. • The stages of the work follow the process of developing working life, including the ideation tools and methods used in working life to promote the creative process. • Participants are offered the opportunity to take over the methods and online tools of the creative process. • Participants gain experience in collaborative work, managing online work and international activities.	⇒ in relation to authentic learning elements 1-7
STEPS 0-10	Working with companies opens up a view of the business world and helps the participants practice not only interaction skills, but also entrepreneurial skills, helping them understand the requirements of entrepreneurship. • Working with companies also enables the students' knowledge to be brought to the fore and the opportunity to network. • Through participation, companies are given the opportunity to learn and receive support from coaches, as well as perspectives from students and the various experts involved. • Companies are offered the opportunity to network with companies in the international creative industry and with students.	⇒ in relation to authentic learning elements 1-5, 8-9

The AuLE structure appears as a process-centered LE, as described by Helakorpi (2017). Its elements form a combination of a process that includes participants (students, entrepreneurs, and experts), online interaction, creative and innovative methods and tools, internationality, learning spaces, a creative clinic, and a core that is a step-by-step method supporting and guiding creative learning, leading to a finished concept through collaborative work (Figure 4). The virtual work was taken into account by placing it into its own step (3), which ensures that online tools can be trained, guided, and networked to enable international interaction with the team.

Figure 4. Creative Steps 2.0 model development and levels of the authentic learning environment.

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The LE that was shaped through the theoretical framework, development needs, and co-design focused on the desired benefits for the participants (Figure 5), which were identified and analysed through the results from the entrepreneurs' perspective. The aim was to provide entrepreneurs with an international development environment and collaborative work with an international company, through which the possibility for networking was created. A group of students devised a new product or service with companies. Because of international activities, the work was organised in online interaction, and the process was guided by coaches. In addition, external experts from various sectors aided in the work.

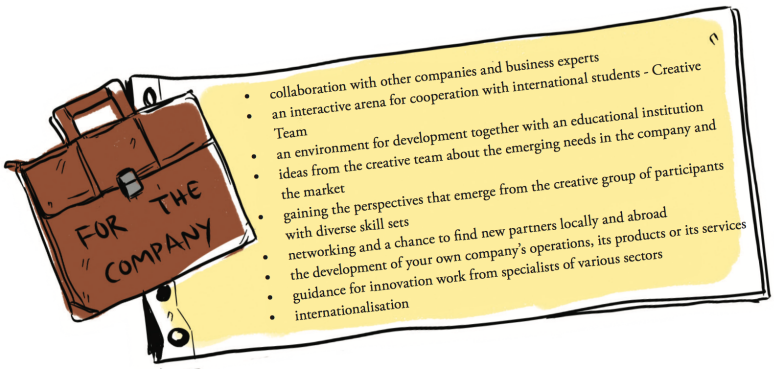

Figure 5. The desired benefits for the companies.

Result—Benefits for companies

Creative Steps 2.0 workshop context and participants

The AuLE was used during a 10-day innovation workshop called Creative Steps 2.0, and the implementation took place in 2016. The implementation was organised by Lapland UAS. The companies participated in the process only online. The students also worked part of the time in the same space. The nature of the online work was blended learning[1] based on online interaction. Students were given the opportunity to develop their skills in a creative process during the development of companies' innovative products and services. The idea was to train students' entrepreneurial thinking and innovation skills using a future development task from companies in international, multidisciplinary cooperation with entrepreneurs.

From the Arctic region, four creative companies from Lapland, Finland, were selected from the target group of the CM project, for which international business pairs were matched from the project partner countries: Sweden, Ireland, and Northern Ireland. A total of eight companies were selected for implementation. The creative companies involved were small companies, mainly one-person-enterprises, and the participants in the study and, thus, the respondents were entrepreneurs. Fifteen students participated in the implementation, so the entrepreneurs and students formed a total of four creative teams. In the current article, attention is focused on the companies in the analysis of the material.

Data

In addition to qualitative data, we utilised quantitative data in our research, especially when the entrepreneurs evaluated the final concept as the end result of the workshop. The emphasis was placed on a qualitative analysis. At the end of the implementation, the benefits for the entrepreneurs were collected with a pre-themed online survey tool (Google Forms), which consisted mainly of semi-structured or closed questions. The total number of responses was n = 6/8. The material was read several times to see if new categories were formed, after which the material was systematically analysed using content analysis and coded into new categories. The main aspect of the development of the LE was to understand the companies' experiences, what benefits they have experienced through participation, and what challenges emerged that can be identified as targets for further development. The aim of the survey was to understand the success of the implementation, which Herrington et al. (2010) define, from the perspective of DR, as important for the development of practical implementation. The study did not pay attention to differences in the responses of different countries but to the experiences of the participants in general. The questions were targeted in such a way that the benefits could be interpreted from different points of view through a content analysis, such as: *how important…, how did the company benefit…, the success of…, relevant/beneficial…, be interested to continue…, How innovative was the idea?*

Companies were asked to evaluate the outcome and its effectiveness by using the evaluation criteria and, thus, how innovative the idea and outcome were, rating this poor, fair, good, very good, or excellent (1–5). Evaluation criteria was derived from Innomaratos's concept and utilised in the previous CS iteration (Arkko-Saukkonen, 2017; Valli, 2007).

Analysis of companies' experiences and findings regarding benefits for companies

By answering the research question - *What benefits did the companies receive during implementation, and what are the identified challenges?* Through creative work, the benefits experienced by the companies were compiled into the map (Figure 6), which shows the perspectives based on the responses and will be discussed in more detail below.

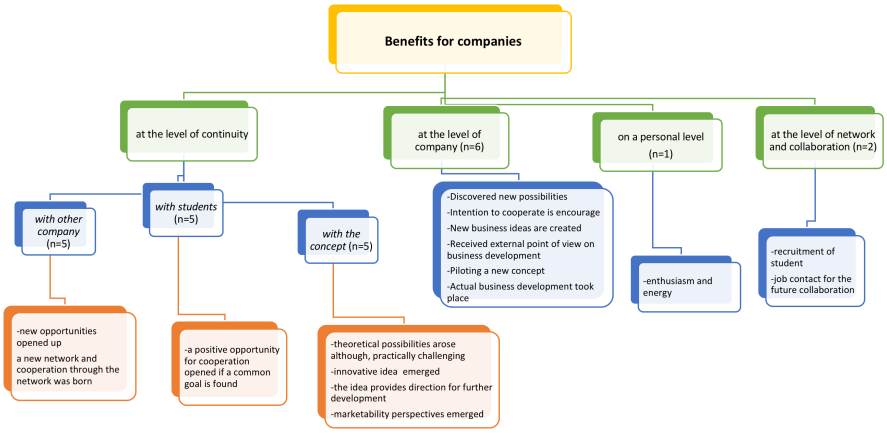

Figure 6. Companies' benefits described in the categories.

At the level of continuity:

Continuity was divided into the continuation of the cooperation between the companies, potential cooperation with the students, the further development of the concept, and the possibilities for implementation that emerged from the material.

With the pairs of companies:

One pair of companies built a collaboration, expanded their networks, and created a team-designed concept that modelled a concrete service. It was taken for practical testing. As a result, collaboration continues between these two companies and also through a concept produced in an AuLE. The remainder of the participating companies were wary of opportunities for cooperation, and several mentioned that it was too early to say whether cooperation would continue.

> *B4: "We have 2-3 ideas we will discuss further. In order to benefit from each other in terms of marketing"*

With the students:

The two entrepreneurs increased the odds of continuing the collaboration if there was some suitable, concrete way of doing so. One of the companies gave no answer. However, the collaboration of one team was fruitful and created a further opportunity to for a student to work as an assistant. In addition, through one answer, the entrepreneur highlighted how impressed she was with the student's work and the time students invest in the work, but she also wondered whether the entrepreneur's needs matched the student's future goals.

> *B1: "It was innovative, however I think of the result as something that could work theoretically, but to make it work in reality, a lot more needed to be invested (time, energy, money)."*

With the concept:

The concepts implemented during the creative innovation process were critically examined by the companies, and the results were viewed with scepticism by each company, with a view to the future. The average of the evaluations was between fair and good (Figure 7).

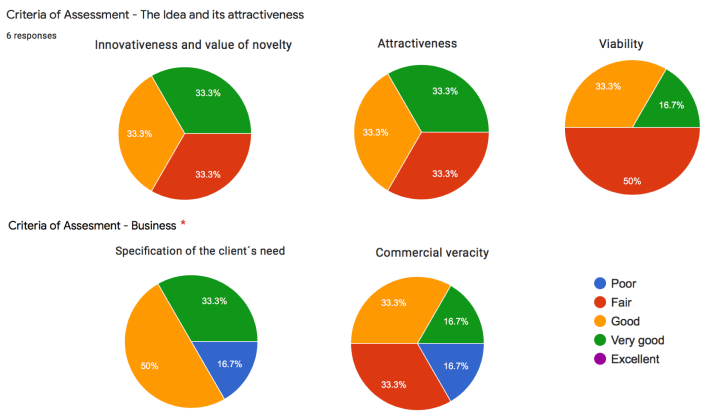

Figure 7.

The companies' evaluation of the outcome.

Opportunities were found in the concepts, but the entrepreneurs said they needed to consider realistic perspectives. It takes time, money, and resources for small entrepreneurs to further develop the concept and take it to implementation.

For the personal level:

One entrepreneur was enthusiastic about the experience of participating and felt that her business had added value because new opportunities opened up with the help of another entrepreneur. Companies in the creative sector are mainly small businesses and often run by one person, which is why there was no time to develop or build networks because daily routines filled the everyday life of the companies. One entrepreneur summarised as follows:

> *B6: "It's hugely beneficial. For me as a sole trader, it is easy to get bogged down in the day-to-day running of the business. This process made me stop, think and look at my business in a whole new way - through the eyes of the students and the other businesses. I found that following the presentations I was really buoyed up and enthusiastic about my business again - it reinvigorated me." – "It was fantastic. I have been raving about the process ever since, recommending it to fellow craft businesses. It has also given me a personal boost and inspired me to really grasp the opportunities presented in the coming months"*

For the company level:

Each company mentioned that it had benefited from the experience, at least to some extent, although the concept was evaluated very critically from the point of view of further development. Through the results, collaboration on this issue brought new ideas and future directions. Similarly, the two companies felt that the collaboration broadened their perspective on how they saw their own company as part of the creative industry.

One entrepreneur pointed out that at this stage, he could not yet name the benefits of participation, but ideas arose that could be followed up on at a later stage. During the creative process in an AuLE, one real concrete benefit emerged for a creative team. The students, together with their entrepreneurial couple, were able to develop a concrete service that was later implemented and was also attended by one student of the team as an assistant. However, in assessing the benefits of implementation-style collaboration, one entrepreneur highlighted the fact that in terms of design, it is appropriate to process the lessons learned, analyse, and rethink to determine the real requirements of the market.

> *B4: "But maybe a little more down to earth and cost analytical elements should be included. And the market's need and desire for the new product, it is in real life?"*

There was also the idea that the entrepreneur himself did not experience learning something new but saw an implementation like this as benefitting the students more than the companies.

> *B5: "it was perhaps more so for the students, however it did lead to some concrete stuff to work with."*

For the network and collaboration level:

The feedback survey examined the importance of the international network. Based on the results, one company felt that the international network was secondary and not a topical issue for his company, mentioning that certainly, all national and international connections bring new opportunities for the company. The remainder of the entrepreneurs described the international network as important or very important. The two companies expressed their willingness to expand their international customer base. One mentioned that operating via the Internet is not location dependent, especially when the company is a digital company. One entrepreneur saw the interaction created in the collaboration as bringing a wider network through opening up new opportunities, as well as inspiration and ideas that open up a cultural perspective.

> *B6: "It is a source of inspiration, encouragement and new ideas. Cross pollination of creativity. ---- It makes you realise that although you're from different cultures and different countries, the common thread is the love of what we are making, the creative process. Building on this link now --- Without this international network I could not have done this."*

The challenges in online interaction were technical problems and difficulties in logging onto a platform, as well as the need for guidance for companies. However, one of the participants mentioned finding an alternative solution. She drew attention to basic teamwork practices that would take into account the presence of other participants and would be important to show who is talking in the online interaction. Time was limited for some entrepreneurs, so they had to be away from appointments, or they were in a place where the network connection did not work smoothly.

Through the collaboration, new acquaintances emerged, via which cooperation could occur in the future. The implementation process was said to be a new way of working. Another entrepreneur appreciated the students' time commitment to brainstorming. The creative process appeared in a form in which one could learn, analyse and rethink the issue at hand.

Discussion and conclusion

The purpose of the current study was to further develop the CS model with the help of an authentic learning approach that could serve the new CS2.0 AuLE. The new developed model of CS2.0 supports creative learning and innovative development work, as well as cross-border collaboration. Particular attention was paid to companies that met internationally with another entrepreneur and, with the help of students, built a common product or service through virtual collaboration. By considering the benefits and challenges expressed by the experiences of entrepreneurs, it is possible to interpret the practice of an AuLE and the possibilities of supporting learning and the development of companies in order to understand what enhanced the international collaboration of the participating companies.

The AL framework provided a good basis for building the CS2.0 model. The close connection between real life and the activities organised in an AuLE, along with the experience gained from it, helps to take what is learned and place it into practical concrete situations, even for entrepreneurs. According to Jäminki (2017), data transfer not only takes place unilaterally from

companies to students but companies also have the opportunity to obtain new information through students. Previous research has shown that bridging the gap between companies and universities, especially in terms of innovation capacity, benefits companies because creative activity can be fostered through 'creative spaces', enabling knowledge transfer (Geoghegan, 2017). Here, based on the results, value of the final concept was limited in terms of the concrete concept, but other general benefits, experiences, and perspectives appeared for the entrepreneurs through creative activity.

Six out of eight participating companies responded to our online survey. We have no information about the reasons why the two companies declined our invitation. However, the missing responses reflect a level of participation activity in the CS2.0 workshop that was lower for these two firms than for the other participants. This may explain their missing responses. Attention was drawn to the fact that respondents who were actively involved highlighted the positive aspects of co-operation. Their participation and joint activities produced a feasible outcome with the student team or opened up opportunities to be considered in the future through development work.

The joint interactive work of companies and educational institutions, especially via the network, can close distances, making operations possible internationally (Fiedler, 2016). This study shows that interaction through online work enables cross-border collaboration between companies; this requires careful and timely guidance, clear instructions, and guidance on the use of tools. The results of the current study confirm what was observed in the previous study: how important it is to build close interaction for valuable data transfer and provide timely scaffolding in joint online interactive activities (Jäminki, 2017). Davies et al. (2012) see the contribution as promoting creative activity with the creation of interactive situations and the use of ICT. By utilising online tools, international community action is possible, and from the point of view of accessibility, interaction through online plays a key role in the Arctic (Lipatov, 2014: 14). For this reason, a clear structure is needed for a model of CS2.0 that can support online collaboration. Working online also creates a more ecological and sustainable way of doing things, without requiring travel between countries.

Based on our research, co-design provides added value to implementation design by enabling a prior understanding of the business perspectives that influenced the development of CS2.0. On the other hand, co-design highlighted how complex the field of activity entrepreneurship itself is, as well as the varying field of entrepreneurs in the creative sector. Steen et al. (2011) emphasise that before co-designing, there must be a clear awareness of what goals are to be pursued through co-design and the content that will match what is needed. From the perspective of Sanders and Stappers (2008), co-design is one field of community-produced creativity that can be used to promote more sustainable solutions for the future. Service design provides tools (see Design Council, 2020; Chasanidou et al., 2015) with which to develop more sustainable solutions and thus address the needs of society and support DR by providing useful tools for the design of education are required. The UAS must be able to meet the needs of society through the development of education and RDI activities that have been integrated into education so that they can meet the needs of the Arctic region and international activities. Contextual thinking and service-centred solutions can lead to change (Manzini, 2009). AuLE CS2.0 has been developed in relation to the requirements of working life.

The study has certain limitations. In addition to using an online survey, interviewing the respondents could have produced more in-depth knowledge about their views and experiences.

The students' experiences were gathered from the implementation, but they are presented separately in another article, which introduces several iterations of the development process. The following research article discusses the role of students as part of creative work. This article was intended to focus on content related to the development of entrepreneurs in the Arctic region. However, from the perspective of AuLE development, the development phases are described in detail; thus, they are presented according to the design of the study. The current research provides one model of an AuLE that supports the creative process, innovation and entrepreneurship learning, and collaboration with companies.

Notes

1. Blended learning is a combination of face-to-face and online learning (Güzer & Caner, 2014).

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