FUTURE SCENARIOS IN GENERAL DESIGN EDUCATION AND 21ST CENTURY COMPETENCIES

Tore Andre RINGVOLD and Ingvild DIGRANES
Oslo and Akershus University College of Applied Sciences

ABSTRACT
The latter part of the 20th century and the beginning of the 21st century has seen societies changing in a more rapid speed, and what is seen as important competencies have changed. There is an increasing demand in general education to ensure that the pupils and students acquire what is coined 21st century competencies or soft skills. Education can in many instances be recognised as working with the appropriation of theory, skills and facts where tests, questions and problems deal with right or wrong answers. Soft skills however, place the focus not in the theory, but work with developing human capabilities. These cannot be tested in right or wrong answers, but are seen as abilities, attitudes and values in addressing more complex problems that does not have a set answer.

This paper considers whether creating and working with future scenarios as part of a general design education can contribute to the development of 21st century skills and competencies. Decision makers, educators and official reports from the OECD, the European Commission and national governments points out which competencies are seen as important skills for the school of the future. This paper explores whether the types of learning outcomes identified in the study can contribute to the development of the 21st century competencies as described in examples of discourse.

Keywords: Design education, 21st century competencies, soft skills, future scenario, speculative design, critical design, design fiction, design thinking, sustainability, citizenship, literacy.

1 A CHANGE IN DESIGN EDUCATION AND A SOCIETY IN CHANGE

With the world and societies changing at a rapid speed, the educational systems need to provide its citizens with the skill sets that will make them capable of solving problems and creating new opportunities for themselves and fellow citizens in a changing world of today and tomorrow. We see design education, both at a general educational level and tertiary level, as an important role player being instrumental for future citizens in the development of the skills that are necessary for a sustainable development of our societies.

The general design education has in the latter decades changed from a charismatic focus on child art to the restoration of a knowledge-based design education. This change of culture and framework for the general design education allows for a focus on providing design education to create future reflective citizens and a platform for the possible development of skills and competencies that are needed for meeting the demands of society. The tasks ahead are enormous. Battling climate change, unemployment, possible social unrest and other geopolitical challenges demands an ability to understand the world we are living in and capability to create and innovate.

The study *Future Scenario Building and Youths' Civic Insights* [1] addressed whether working with future scenario building, taken from industrial and product design, contribute to meeting society's demand for empowerment and reflective citizenship. This paper intends to further look into the concept of 21st century competencies, and address the challenges of meeting this demand at the level of general education.

2 COMPETENCIES FOR THE FUTURE IN A CHANGING WORLD

Policy makers and decision makers are increasingly voicing the need for skills that can meet the challenges of tomorrow. With its research and innovation program *Horizon2020,* the European Union aims to secure Europe's global competitiveness. One of the strategies to do so is to empower the young through skills for innovation and entrepreneurship, including social entrepreneurship, which is pointed

out as particularly important to build more inclusive societies giving opportunities to all [2]. Some of the skills they highlight are *creativity*, *problem solving skills*, *entrepreneurial skills* and *collaborative skills*.

In their literature review of 21st century competencies Finegold and Notabartolo identified 15 competencies important for the work force of the 21st century. *Creativity/innovation, critical thinking, information literacy, problem solving, decision making, flexibility and adaptability, research and inquiry, communication, initiative and self direction, productivity, leadership and responsibility, collaboration, ICT operations and concepts, digital citizenship* and *media literacy* [3].

These skills pertain to processing problems and tasks that have no set answer, and are more concerned with good or bad, rather than right or wrong. While hard skills follow rules, soft skills often work the other way around. Aiming at training youth in formal education setting for these skills, forces some questions. How do you equip youth to 'think outside the box'? And when the questions that youth are asked to tackle are not right or wrong, but deal more in the ethical questions of good or bad solutions or consequences, how do you frame the work done?

3 RESEARCH STRATEGY

Using the data from the school project 'Build your own future' that was conducted with a Norwegian 7th grade class in the fall of 2013, we ask; how can the use of future scenarios and speculative design activities prepare youth for the challenges of tomorrow and foster 21st century competencies?

The research strategy used in this study was action research. Action research can be seen as a method to improve practice and produce evidence on how the practice can be improved [4]. Through the collection of empirical data, analysis and discussion we wanted to show how scenario building can contribute to the possible content and development of design education. The data gathered through the study was participatory observation notes/photos/audiotapes, qualitative research interviews, and the students' scenario work.

In the course of two weeks the students worked with six main tasks. The work resulted in written and visual descriptions of society in the year 2043. The tasks consisted of interviews with elders and completing surveys about society today and before, information gathering/context research, future scenario development, collage presentation work, design specification development and design development and drawing. The work of 12 of the students formed part of the empirical data for the study. It consists of visual collage presentations of the scenarios, and product drawings with descriptions that were integrated into the sketches. They were created during the design process that followed the phase of scenario development.
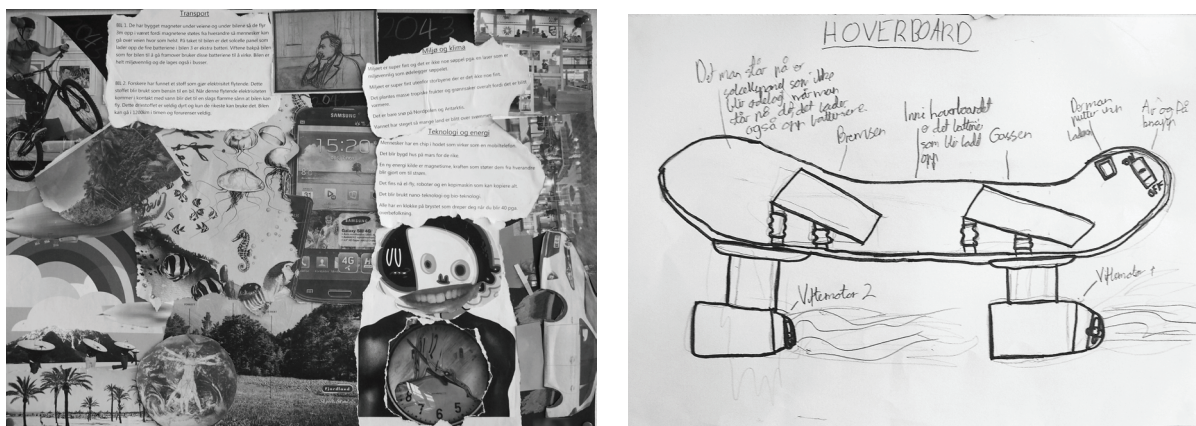

Figure 1. Collage and product drawing from student 12 years

The development of the school project was based on an understanding of future scenario building as a four phase process: 1. Finding a focus area, 2. Identifying and describing driving forces 3. Development of the scenario and 4. Presentation of the scenario [5]. The scenario was the setting for a future product designed by the students. The students' work, and research interviews with the students form the empirical basis for this study. In the interpretation of the empirical material, several types of learning and insights that can contribute toward answering the research question were identified.

Within the framework of action research, one of the authors acted as teacher-researcher in the two-week period the school project lasted, together with the teachers the class normally had. The teacher-researcher has experience and background from teaching and as a design professional and did not have any prior knowledge or connection to the school or any of the students or teachers involved in the school project. To gather data from observation, the classes were audiotaped, notes made and photographs taken. Student work was photographed, and interviews audiotaped and transferred into typed text. The student interviews were organised in focus groups of three and three students. The research followed ethical regulations of individual and parental consents.

4   FUTURE SCENARIOS AND SPECULATIVE DESIGN

The concept of design is usually and traditionally thought of as giving form to an object or product for aesthetic and functional reasons. But the concept of design has changed and is changing. Design is increasingly seen as beneficiary to many other aspects of human life as well; As a promotion of sustainability through material and manufacturing choices, but also through the way designers think and the framework of processes they work within [6]. Fuad-Luke sees the role of designers as having an opportunity to change society, and he states that design can be used as a tool for activism [7]. He describes this design activism as creating a counter-narrative. A narrative that seeks to create and balance positive social, institutional, environmental and economic change. This counter-narrative can be created through fantasy, practice and a design way of thinking. According to Fuad-Luke [7], design activism can also create a change in the activist him/herself. In this understanding of what design knowledge can be, we see design as an opportunity to actively change society for the better, either through fantasy, design practice or design thinking.

Artists and designers have for a long time created conceptual products set in the future. The term 'future scenario building' within design can be understood as a working method that describes a possible future, as well as how this work can provide fertile grounds for innovative and challenging design processes. In the professional design context, it is not the scenario itself that is the goal but rather the design process that follows afterwards [8]. The scenarios are often a narrative, and they follow a certain approach or form. Future scenarios can help designers to avoid excessively favouring the present [9]. Through the use of scenarios, designers can free themselves from the idea of what a product is. Scenarios can be seen as an important tool in creating a better relation between products and user needs [8].

Scenarios and design can also be seen as having common qualities. They are both future directed and are attempts at prefiguration [8]. In light of Willis, we see future scenarios as pre-figurative thought exercises that are similar to design, that is, having an idea about how something should be and actualising it.

Design can be an opportunity to speculate about how things could be and to try out possible futures to create a ground for discussion and reflection about society today [10]. Possible futures created should not necessarily be positive ones, as a positive future might not provide the best material for discussion or reflection about today [10]. With a focus on more negative and darker futures, it might be easier to spark reactions, thoughts and reflections about what we see as negative developments in todays society. Scenarios can be a possible opportunity to critique and also use design as proposals that challenge the existing.

5   FUTURE SCENARIOS IN GENERAL DESIGN EDUCATION

Using future scenarios and speculative design projects in general design education can help students see solutions and products in a wider context. In the paper *Future Scenario Building and Youths' Civic Insights* [1] we considered whether future scenario building in design education can serve to increase students' civic insights regarding sustainable development. The school project, 'Build Your Own Future', including 7th graders' work and interviews, formed the empirical basis for the study. In this paper we explore and discuss if the learning outcomes identified in the study can contribute to the development of 21st century competencies as described.

Through working with future scenarios many of the students described a joy of shaping the unknown. They identified problems and described new solutions [5]. Nigel Cross argues that good designers have a special way of thinking: "Rather than solving merely 'the problem as given' they apply their intelligence to the wider context and suggest imaginative apposite solutions that resolve conflicts and uncertainties" [6:136]. This description of design thinking is comparable to the work done by the

students in the project. In their descriptions of the future they identified problems of today and tomorrow, and in design solutions aimed at solving these problems. Such as the student's *Cloud Bed* (Figure 2) which is not only a hovering bed shaped as a cloud, but the product is also described as being part of photo synthesis. The student work shows in our view how general design education can contribute to the development of 21st century competencies or skills as identified by the European Commission. The use of future scenarios and speculative design can contribute to developing skills of creativity and innovation. Through learning to see the bigger picture and products in a wider context, problem solving skills can develop through approaches that favour the students research capabilities and creativity.
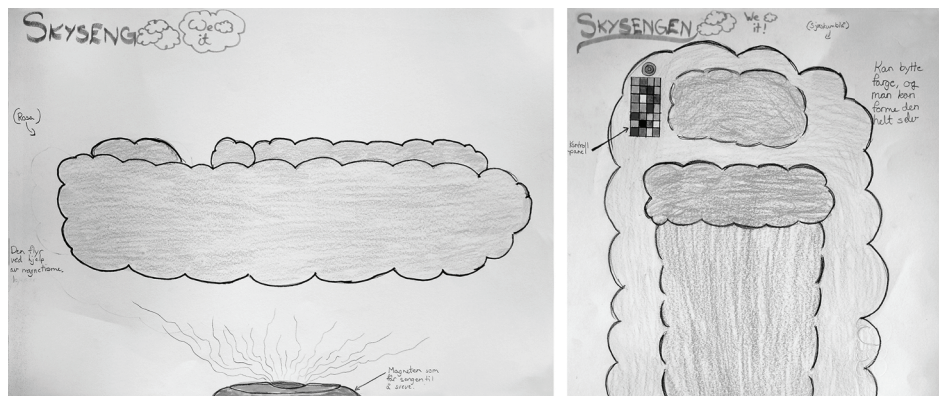

Figure 2. 7th grade student project work: Skyseng (English translation: Cloud Bed)

Willis compares future scenario building with design as they are both pre-figurative thought exercises. We saw in the students' work how this pre-figurative thought process stimulated them towards seeking new solutions and giving shape to something as yet unknown to them. This competence is seen as a fundamental human capacity and the basis for all design, not just professional design practice [8]. Through general design education, this important capacity can be fostered in the coming generations, and can contribute to the development of skills not only of future professional designers but among future citizens as a whole. Liv Merete Nielsen states that visualising ideas and solutions not yet articulated presupposes a competence to visualise these ideas. It does not happen naturally [11]. It needs to be trained and developed, and we believe that a good arena for this is the general educational school system, where citizens can work with a common set of teaching goals. Capper [12] sees the use of future scenarios as a powerful tool for designers to develop knowledge about the future which can contribute to innovation.

The OECD identifies *Autonomy* as one of three main areas of 21st century competencies. They further state:

> In general, autonomy requires an orientation towards the future and an awareness of one's environment, of social dynamics and of the roles one plays and wants to play. It assumes the possession of a sound self-concept and the ability to translate needs and wants into acts of will: decision, choice and action. [13:14]

They describe the 21st century competency *Autonomy* as: "The ability to act within the big picture". To be able as an individual to understand and see the consequences of their decisions and actions within the framework of their wider context. In the study 'Build Your Own Future' the students described worlds existing in the year 2043. Their descriptions in many cases were based on what they identified as driving forces. Wilkinson [14] describes driving forces as larger trends or factors that moves the future into a certain direction. For example; the globalization or the green house effect. The students in their work often included solutions to problems caused by climate change, such as new technological developments, new discoveries of energy sources or a change of politics or consumer awareness. In our view the students in the study showed signs of what the OECD describes as the requirements of autonomy. They were able to see the wider context and act accordingly. In the work they seemed to exercise this competency.

6 FACING THE CHALLENGES OF TODAY AND TOMORROW

The OECD developed a framework of competences and identified three categories for key competencies needed for a successful life and well-functioning society [13]. *Using tools interactively*, *acting autonomously* and *interacting in heterogeneous groups*. They emphasise that leading experts and academia argue that to cope with the challenges we face today, we need a better development of individuals' abilities to deal with complex mental tasks. A development of abilities well beyond the basic reproduction of accumulated knowledge. "Using key competencies involve a mobilisation of cognitive and practical skills, creative abilities and other psychosocial resources such as attitudes, motivation and values"[13]. Reflective thought and action has to form an underlying part of the framework of competencies. Through reflectiveness you can adjust and modify what you have learned so that it benefits you and your surroundings in a greater extent.

Through exercises and tools like future scenarios, students can practice pre-figurative thinking and actualising design. Many of the students in the project told about a joy connected to themselves being able to shape the future: 'It was fun to think for yourself and hoping how the future becomes and how you want it to be […] It was fun to make inventions, and thinking how to make'. They tell about a joy of thinking about the future, working with hopes and own wishes, and to describe and think how this future can materialise, either in the scenario or in the product design. In our view the student made reflections about his own future through shaping the unknown. In scenario descriptions, and through visualizing and thinking out solutions in the design work. Some emphasized the importance of there not being any right or wrong in this project, and that they could decide what the future could look like. They expressed joy of shaping the scenarios and making their own decisions: 'What I liked about the project was that there wasn't…that you said that there wasn't any wrong way of doing it. That we could imagine 2043 the way we wanted to. That there wasn't any wrong way'.

In a teaching situation where students get to work with future scenario building, opportunities to see products in a larger context might facilitate a greater understanding of topics such as consumption and environmental impact. In the words of a student: "I didn't think much about it […] Now that I get all this down on paper, I think it's much more important than that". We question whether this approach can provide the students an opportunity to see the challenges and problems within an overall context and whether it can prevent the alienation of issues and topics such as sustainability.

Figure 3. Media and communication. School project Media 2046. Student project work

The methods of future scenario building can be used in a wider educational context outside the core design subjects. Finegold and Notabartolo [4] lists media literacy as one of fifteen competencies for this century. In the school project 'Media 2046', a new project in the Norwegian upper secondary educational programme Media and Communication, students identified media trends of today and tomorrow and through working with future scenario building created future scenarios. They further developed and produced media products and stories that took place within those scenarios. The stories gave an insight to a series of thoughts and reflections about the direction our society might head into.

The project seemed in our view to provide a framework for critical thinking and reflection. In Figure 3, a student tells a story about a future where technological developments, robots and automated processes might be a threat to humanity.

The new markets we see develop throughout the world is often both innovation driven, and fronted by entrepreneurial youth creating entirely new job markets from their interests or new technological solutions. The schools can either ignore the need for educational change, or it can be a positive force in how these new markets are shaped in terms of ethics or responsible innovation. Malpass [15] sees the ability to provoke discussion on an object and to engage a public as an instrumental application in design research. We further see this possibility in future scenario building and design as a framework in education for insight, reflection and critique. The stories provided by the students can engage themselves, fellow students and a wider public in discussions and thoughts concerning ethics, societal and technological developments.

Design processes, tools and way of thinking can equip youth to 'think outside the box' but to do so the tasks they undertake cannot be fixed or final in form. When the questions that youth tackle within these problems are not right or wrong, but deal more in the ethical questions of good or bad solutions or consequences, the reflective thoughts will drive the discussions, peer response and consideration of societal driving forces while considering how something can be 'good', but have 'bad' overall consequences for the environment or people.

REFERENCES

[1] Ringvold, Tore Andre and Digranes, Ingvild (2015). Future scenario building and youths' civic insights. Vande Zande, Robin Bohemia, Erik Digranes, Ingvild (Red.), *Proceedings of the 3rd International Conference for Design Education Researchers Learn x Design, Vol. 1-4*. Vol. 2, chapter 3: Design Education to improve Life and the World. s. 800-815. Design Research Society. Available: http://hdl.handle.net/10642/2844

[2] European Commission. *Horizon 2020 - Work Programme 2016 – 2017. Europe in a changing world – inclusive, innovative and reflective Societies.* Available: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-societies_en.pdf [Accessed on 2017, 17 February], (2016) 13 December.

[3] Finegold D. and Notabartolo A. S. (2010). 21st century competencies and their impact: An interdisciplinary literature review. *Transforming the US workforce development system*, 19-56.

[4] McNiff, J. (2013). Action Research. Principles and Practice (3 ed.). Oxon: Routledge.

[5] Ringvold, T. A. *Bygg din egen fremtid. Fremtidsscenariobygging i faget kunst og håndverk* (Master thesis), 2014. Available: http://hdl.handle.net/10642/2114.

[6] Cross, N. *Design Thinking*, 2011 (Berg, Oxford).

[7] Fuad-Luke, A. *Design activism. Beautiful strangeness for a sustainable world*, 2009 (Earthscan, London).

[8] Willis, A.-M. Editorial: scenarios, futures and design. *Design Philosophy Papers*, 1, 2005, unpaginated.

[9] Thorpe, A. *The designers atlas of sustainability*, 2007 (Island Press, Washington D.C.).

[10] Dunne, A. and Raby, F. *Speculative Everything: Design, Fiction, and Social Dreaming*, 2013 (MIT Press, Cambridge, Massachusetts).

[11] Nielsen, L. M. (2013). Visualising ideas: A camera is not enough. In J. B. Reitan, P. Lloyd, E. Bohemia, L. M. Nielsen, I. Digranes, & E. Lutnæs (Eds.), *Design learning for tomorrow. Design education from kindergarten to PhD. Proceedings of the 2nd International Conference for Design Education Researchers.* 14-17 May 2013, Oslo, Norway, pp. 2080-2089. (ABM media, Oslo).

[12] Capper, M. Scenarios as a design and product planning tool. In *Innovation Summer 2004,* 34-39.

[13] OECD. *Definition and Selection of Key Competencies – Executive Summary.* Available: http://deseco.ch/bfs/deseco/en/index/02.parsys.43469.downloadList.2296.DownloadFile.tmp/2005.dskcexecutivesummary.en.pdf [Accessed on 2017, 17 February], (2005) 27 May.

[14] Wilkinson, L. *How to Build Scenarios.* Available: http://www.wired.com/wired/scenarios/build.html [Accessed on 2017, 20 February]

[15] Malpass, M. *Critical Design in Context. History, Theory, and Practices*, 2017 (Bloomsbury, London).