

CREATIVITY SHAPES FUTURE LEARNING PROCESSES IN SCOTLAND AND IN NORWAY

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ABSTRACT

This paper describes collaborations between Product Design Engineering (PDE) at Glasgow School of Art (GSA) and Hisøy School, Arendal and discusses the pointers for developing learning processes which have emerged. Developments in creative studio based learning processes in Scottish design education inspired Hisøy School and Arendal Council to seek collaboration with Dagfinn Aksnes and PDE at Glasgow School of Art. An article by Ingvild Paulsen [1] describing the new design learning process for schools led to invitations to present this to personnel at Hisøy in October 2004 and April 2005. There have since been exchanges of teachers from Hisøy to GSA and of PDE students from GSA to Hisøy and these exchanges have produced shared insights into the role of creativity in learning and have influenced thinking and developments in both institutions.

A *design, build, test, evaluate and modify* project (SUBSUNK2) has been undertaken in parallel by both PDE L2 students and 8th year pupils at Hisøy School. This has created the opportunity for comparisons and discussions about how to facilitate learning processes and to investigate the nature of creativity in the learning process.

This collaboration is of an experimental and speculative nature and has demonstrated that working across different educational systems and cultures can deliver valuable benefits. It is possible that by harnessing the individual creativity in the learning process, improvements in learning and attainment can be achieved.

Keywords: Creativity, learning process, learning by doing, mastering, collaborations, multidisciplinary, inspirations, curriculum development

1 INTRODUCTION

The authors believe that a deeper understanding of creativity in design and learning processes may hold the key to design as the third educational culture and that there may be important discoveries to be made through research in this direction. Archer [2] and Cross [3] argue that design is sufficiently distinctive and unique to be regarded as a third educational culture, in addition to science and the humanities and that the theoretical foundations for design and design education needs to be strengthened through research. It has long been apparent that Mode 2 learning has many positive benefits for learners in Design and Technology and that these benefits hold much potential in developing new learning processes in a broader spectrum of subjects. This may be in part due to Mode 2 learning seeking to harness the individual creative force as a vehicle for learning as opposed to Mode 1 focusing on monolithic and hierarchical knowledge and 'correct answers'. The authors have taken the opportunity to develop

and try out Mode 2 approaches to learning and discuss their outcomes with a view to future developments in learning. All this is taking place against a background of design being introduced as a multidisciplinary subject in Norwegian schools and a strengthening of Norwegian curricula focussed on the *holistic human being*.

According to physics and mathematics, the task of keeping a body, the human body if you will, in a stable equilibrium either standing or walking is very complex and calls for numerous complex equations to be continuously and simultaneously resolved. Yet children learn to crawl, walk, jump, run, dance, cycle, swim and a whole range of similar complex visual/spatial skills in early life. They do it not by learning the maths and resolving equations but through the experience of practice (including failure) and through a non numeric, non verbal language expressed through intuition and doing, doing with the whole body and its senses together at once. This has nothing to do with numeracy, literacy, logic deduction or classification but it has everything to do with a different kind of learning. The maths and physics is being processed not by numeracy, literacy or logic but by another 'language' where instead of numbers and words, the whole mind and the whole body together measures, approximates, assesses, decides and processes signals from the senses both subconsciously and consciously at the same time, and converts these to useful information. The question is: Why then is it that children sometimes find it difficult to learn even relatively simple mathematics, physics etc? Could it be that the 'language' of science and literature is alien to human learning? Design learning is similar to the experiential learning described above, it deals with simultaneously sub conscious and conscious thinking, with processing information from the whole sensory system and from 3 dimensional spatial reality in all its complexity, not by breaking the environment down into bits that can be analysed and classified but by perceiving through creativity what the wicked problem is and proposing a range of possible solutions to it. So how do we teach this?

2 INDICATORS FOR CHANGE

Kjell Johannessen, leader of NODE, the umbrella organisation for a large part of Norway's oil exploration and manufacturing industry (in Southern Norway) says: "There is consensus amongst our industry leaders that the products which make us world leaders today are not the products which will make us world leaders in 5 years time. If we do not continually evolve new world leading products, then we will loose our customers and our best design engineers will lose interest and we will not be able to retain them."

Another look at the shape of the future in 2025 holds that: "FOUR enabling technologies will be central in shaping the world of 2025, each introducing capabilities that will extend far beyond their immediate applications to effect a network of change throughout society, much in the same way as the introduction of the electric light and the automobile at the turn of the century powerfully shaped today's world. These four drivers of change are: *Information technology, materials technology, genetics and energy technology*. A FIFTH primary driver of change, *environmentalism*, represents not new capabilities, but a changing worldwide orientation. *An emerging pattern of attitudes and beliefs about sustainability and uses of the Earth will direct the shape of the future as powerfully as any of the four enabling technologies*" Coates, Mahaffie and Hines[4]. These indicators and others are useful in evolving the agenda for design education and indeed for education in general.

It should be clear to anyone involved in education and especially design and technological based education that the future demands on our creative designers require

us to review and develop new ways of design learning now in order to prepare our young people for the challenges they will face.

3 COLLABORATION AND EXCHANGES

In the autumn of 2005, 4 teachers from Hisøy visited PDE at GSA for 3 weeks, 'shadowing' the PDE Level 1 and 2 studio processes and also visited Plockton Primary and Plockton High Schools in the Skye and Loch Alsh area, both of which have long standing links with PDE. In September 2006, 7 PDE L1 and L2 students visited Hisøy School for 3 weeks. Their activities there included working with multidisciplinary teams to create and develop proposals for design inputs into the new school development underway at Hisøy, delivering a three day design teaching programme for 8th year pupils, presentations for council leaders and community groups, industry visits, experiencing the unique coastal culture and nature of southern Norway, social activities and sports.

3.1 The Hisøy teachers experience

'It was very inspiring and informative to experience the GSA studio environment and the diversity of learning and teaching which is practiced there. The value of creativity in learning was strongly evident and we realized how important this can be when applied and supported in the learning environment. Also the suspension of judgement during creative practice to allow a diversity of ideas to be generated before evaluation took place. It was refreshing to observe at close hand how the students applied their design processes in a variety of situations and levels and how they learned to master a great variety of 'design tools'. We have seen in practice how creativity can add value and power to learning processes across disciplines, age and cultural divides. 'In addition we were able to gain an insight into the workings of Art School based education.'

3.2 The PDE students experience

'The collaborative experience at Hisøy was very diverse, we were contributing to the design of a Norwegian primary school-on location, working with other professionals and not least teaching our creative design skills to 40 enthusiastic pupils over 3 days involving clay modelling, brain storming, plaster sculpturing and water rockets! As well as enjoying the 3 weeks thoroughly, we learnt first hand about working with clients, to generate and present creative concepts from observations and discussions with users and to manage a challenging opportunity for creative learning. We also experienced the Norwegian cultural tradition for community collaborative projects or 'dugnad' where groups of people carry out practical projects of value to their community together' The PDE students prepared a multimedia presentation of their experience at Hisøy, showing how they brought their own background to bear on a real multidisciplinary design experience with opportunities for individual creativity, engagement and development. Through their delivery of teaching to pupils, they were able to reflect on their own learning process as well as the pupils learning process. The exchange was also a different kind of a 'working holiday' in a beautiful environment with many opportunities for sports, including a weekend sailing in Norway's beautiful island paradise, 'skjærgården'.

3.3 The Hisøy pupils experience from the PDE students exchange

'Our experience of learning with the Scottish students was like playing, like we ourselves play. They used play in the learning and we played in the learning together

with them' 'It was a different kind of school, it was fun. We used knowledge from other subjects like mathematics, geometry and physics to develop our designs and make them work. We became inspired and wanted to achieve results, we even worked during our break times. We spoke in English all the time, this was a challenge at first but it went well and we steadily got better in English during the time. We worked with the students and we shared the learning process with them, sharing ideas openly and achieving better results through this process.' The pupils were exposed to a multi disciplinary learning process, including delivery in English as well as mathematics, physics, design and applied creativity.

3.4 The Hisøy pupils experience of the SUBSUNK2 project

We have been introduced to an intuitive and creative design and realization process where the pupils develop their ideas directly in 3 dimensions by using scissors to cut two different plastic sheet materials and join the parts with hot melt glue. The materials are translucent and available in a rich colour range and ideally suited to translate ideas to artifact in a short time, especially successful for lighting design. This enabled the pupils to complete the whole design process from idea to product in a day and achieve interesting and exciting work which has been greatly admired by others. The process engaged and inspired the pupils and opened up to experience of collaboration, measurement, marking up, evaluation and discussion, cutting and gluing with a great measure of enthusiasm.'

4 STUDIO BASED LEARNING ENVIRONMENTS

When we talk about studio based learning, we mean not so much a specific space, as the learning process is continuous across a range of space and time. It is important however that the learners have ownership of a space and environment which supports their composite learning experience, both as individuals and as a group or groups. This environment is one of shared experience in learning or a community of practice as described by Wenger [5], where the tutors share their professional practise with the learners and the learners share their learning between each other. The studio learning is more of a holistic synergetic experience than simply about the acquisition of knowledge.

The studio needs to be supported by experienced and inspiring staff who can provide multidisciplinary role models for the learners. The support is often individual and of a philosophical as well as a subject specific nature. The learning which takes place between the learners in the studio, either within year groups or between year groups appears to be significant and could potentially be further exploited. We have seen that mentoring by a more senior student of small groups have been highly beneficial in the studio culture. The space needs to be flexible enough to support a variety of learning activities and have good light and equipment. The studio environment is ideally suited to multidisciplinary learning for example bringing together maths (measuring, marking up and geometry with problem solving in design). Good studio practice should provide freedom to explore and experiment and the sharing through discussion between the tutor and learner of the risk implicit in this freedom.

5 CREATIVITY AND LEARNING PROCESSES

Learning could be described as a process of experiencing stimuli which are designed to allow the learners to generate new neural networks, at least some of which are subconscious, producing an interlinked matrix of experience which is at the same time

explicit, implicit and tacit. Successful learning is indicated by the learner's ability to retain this pattern of experience, to apply it to new situations and evolve new patterns of learning through exploration and reflection. While Cox [6] is focussing on the commercial exploitation of creativity, education needs to develop its own creativity focus. We may need to question the limited role of synthesis in Bloom's taxonomy Bloom [7] and reassess a wider and more appropriate understanding of the value of creativity in learning.

5.1 The role of creativity in learning

If this is true, then **learning has a lot in common with creativity** and if we are able to deliberately exploit creativity in learning, then this might open up to improved learning processes and other benefits. Neural networks are physiological entities as individual as fingerprints and the patterns of the retina, more closely the patterns of blood vessels and nerves. Acquiring knowledge or learning, therefore is an individual process, in terms of what works for the individual. Consequently learners should have the freedom to adapt the process as closely as possible to match individual needs in learning.

The fact that children have significantly more neural connections than adults is well known however this knowledge does not seem to have produced any measurable changes in learning theory or practice. The authors believe that children's inherent creativity and enhanced neural networks represents a potential for beneficial developments in the understanding of learning and for exploitation in the general learning process. When learners are able to express their individual creativity in their own learning, this can act as a powerful inspiration for the individual and enhance their levels of attainment. The challenge for educators is to recognise and exploit this power in the learning process. By taking this route, we may find that children are much more capable of learning and achievement than previously realised.

5.2 Learning by absorption versus learning by practice

Traditionally pupils have learnt by absorption of material presented in textbooks and verbally by teachers. This is the typical mode 1 learning which is measured by retention and the ability to produce the 'right answer' at exams or at least reproduce material presented earlier. The learner is expected to accept existing taxonomies, rather than developing their own.

Design however has evolved learning by creative practice, where the learner gradually approximates and eventually masters the design process through undertaking projects with specific challenges and goals. The learner's path through the project is individual and there is a wide range of acceptable answers, not just one 'correct answer'. The starting phase of the project is characterized by an investigation into needs and opportunities and the learner has to deal with uncertainties, ambiguities and evolve their own basis of understanding. The learning is measured by assessment of work, usually a visual folio and a visualization or model at the end of the project. The learner receives regular feedback from the tutor in the studio and at the end of the project, usually in the form of an evaluation of strengths and weaknesses, highlighting the learner's current learning needs. This holistic learning experience allows the learners to reflect on their progress and modify their strategies for further learning experiences.

6 SHAPING THE FUTURE OF LEARNING

Studio based learning can offer many benefits, both for design and in general education. The opportunity and freedom for individual learning processes powered by individual

creativity allows learners to match the learning process to their needs and provides powerful motivation and inspiration. Through collaborations with a range of external industry, organisations, technology providers and individuals, it is possible to broaden and extend the educational experience beyond the normal classroom or lecture theatre. Project based learning can allow the technological experience to become more diverse. By developing a human and environmental focus the learners evolve a designerly, solution based thinking mode Cross [2], which is both a challenge and a strength. Mentoring and peer learning can also be exploited to enhance the learning experience.. Designers would probably benefit most from learning to apply an appropriate range of technical tools rather than proficiency in more traditional theory subjects. There is a balance to be struck in the curricular content as outlined in embryonic form in UK Spec [8] and the curriculum needs to offer better diversity and balance than at present. It is clear that the studio culture outlined above is a good environment to develop an innovative and entrepreneurial culture and that it lends itself readily to bringing all these factors together for maximum added value and synergy. Another intangible outcome from the development of these skills, insights and knowledge is that it will potentially equip individuals to tackle challenges and manage their real life situations from a position of growing experience and confidence. As the learner develops, they build individual skills sets, which enable them to tackle challenge and to attain achievement. This is an important element of mastering the design process and also mastering the associated learning process.

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