

Networked Learning and Design Based Research for welfare innovation through further education

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Abstract

This paper sets out on a reflective journey to investigate, theoretically, the potential of a marriage between Networked Learning (NL) and Design Based Research (DBR) (Barab & Squire, 2004) in a creative and innovative pedagogical practice for welfare professionals. With reference to theoretical views on Innovative Learning (IL) and Networked Learning (NL) the paper discusses how it may be possible to gain knowledge that may help and qualify the development of creative innovative and ICT based learning designs for the future. To discuss this question the authors of the paper explore the entities of a model, which integrate the above mentioned relationships in learning designs. The suggested networked model offers possibilities of innovative learning in further educations. At the same time – in parallel – the suggested networked model offers possibilities of data generation to be used for educational research. The authors of the paper indicate and exemplify how this might be done using the theoretical embroidery of the paper in the light of the model. Finally – on the basis of the methodological and theoretical optic outlined in the paper - the authors point out research questions that may help and qualify the development of innovative DBR and NL designs directed towards the future. Assuming the views outlined and promoted in this paper, the authors claim that researchers in the field as well as welfare professionals in pedagogical, social and health areas, must display creative and innovative competences. Research findings are needed that are generated, iterated and validated through their iterative use in real life settings.

Keywords

Innovation; Innovative Learning; Networked Learning; Design Based Research; further education; welfare professions; pedagogic design; learning design; pedagogic model; methodological model; Mode 2 research, bildung.

Introduction

Innovation, creative and innovative competences are today considered to be “the society's rejuvenating tea”. In welfare areas too innovation is estimated to be an answer to problems, which cannot be solved in traditional ways. Therefore welfare professionals working in pedagogical, social and health areas must be innovative. If they are not - in a life-long learning perspective - they must learn to be so. Herein lies an implicit expectation to *learn* something (i.e. to be able to innovate), but also to *become* something. The latter is described as a new ideal of formation or “bildung”, which challenge learners to work with his/her “inner world” in order to become an innovative and creative person in thought as well as in action (Lund, 2008). Creative and innovative competence may then require a radical change in mind-set in the society as such not only in welfare professions, but also in the educational systems/organisation that is learning, too. As indicated by Carl Otto Scharmer, a researcher in innovation:

[The society and welfare professions calls for innovations and educational institutions must take co-responsibility for helping to create innovation in mindfully ways both in the perspective of basic education and in a lifelong learning] (Scharmer, 2007, p.1)

Here there seems to be a complex challenge for further and continuing educations. Educational systems have “a tradition for evaluating and validating the individual’s knowledge and ability to reproduce (existing) knowledge” (Lund, 2008, p.3) just as professional welfare practices and educations are forced to use evidence-based knowledge from past experiences. In that way future students may be characterized as “prosumers” (Helms & Agerbæk, 2010) who are both “producers” of new knowledge and “consumers” of existing knowledge.

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Therefore, new task and challenges for educational programmes are to work consciously with pedagogies, which stimulate creation in and of an emerging future and at the same include learning from past experiences. These pedagogies may value students' imagination, fantasy and ability to create the unexpected and value not only learning of what already exists. "Creative and innovative skills, the ability to change mind-set and participate in unpredicted actions and activities are thus in high demand and include the educational systems" (Oestergaard & Sorensen, 2012, p.1). "The core idea here is that education, in a very goal-directed way, supports initiatives, which – in turn – result in added value to society" (Oestergaard & Sorensen, 2011, p.1). One of the ways to make this come true is estimated by the European Commission in the description of "the knowledge triangle" (European Commission, 2012). According to EU new knowledge suitable for the public or private sector is potentially generated in *connections between research, educations and work-life practice*. Further educations with students recruited from work-life might in that perspective be a focal point for knowledge transfer, productive learning and a generation of new knowledge, new knowledge-based models of practice, new organisational forms, etc.

As applied to the theme of innovation, it is a view accepted worldwide that ICT should have a central role in education. This relates to the assumption that ICT can support a more learner-centred approach in learning and teaching processes and add "...value for qualitative and innovative learning..." (European Commission, 2010, p.7). However, as stated in a report from the ICT Cluster under EU's Education and Training programme, more lessons have to be learned as the full potential of ICT as an enhancer of innovation is not utilised (ibid, p.18). This cluster's work has resulted in a recommendation in discourse related to innovative learning (IL) perceiving use of ICT not as a goal itself, but as an enabler of teaching and learning. From this point of view the teachers/trainers become facilitators who use ICT to facilitate learners along different pathways of self-directed and meaningful learning.

The concept of IL through technology has thus gained ground in the world with a basic assumption that knowledge institutions and programmes should have a strategic location in relation to innovation in society as a whole (e.g. The Nordic Council, 2011, www.oecd.org/edu/ceeri/; European Commission, 2010). As a result of this, innovation processes have been top-initiated in the field of education, whereas a) development of ideas and concepts; b) knowledge-based designs of education, and c) implementation of ICT and operationalization and implementation of new approaches in the specific courses are expected to take place through bottom-up processes. We propose that these approaches fruitfully involve a "knowledge triangle" with representatives from research, educational institutions and students from welfare practices.

Challenges for educational research in the future

As follows from the above the main questions for educational design in further education must be: What characterize pedagogies for innovative and "prosuming" based learning related to welfare professionals participating in educational contexts between research and work-life practices? What characterize ICT supported learning-designs in educations, which purpose is to develop students' innovative and creative competence "bildung" and mind-change and by that support innovation in welfare practices?

These questions are not answered adequate until now even though attempts have been made. Worldwide national governments and international organizations as mentioned above appear to have taken up the research challenge of innovation in educational contexts. But insights into the relation between technology-use, education and adult learning for welfare professionals, social- and citizens-directed innovation are still lacking. "Research and studies need to look for holistic approaches and solutions and the effective use of ICT and its impact on learning processes outcomes and standards" (European Commission, 2010, p. 11). Just as there is still a need for research based development of innovative pedagogies, especially in relation to non-mercantile and non-technical areas (Nordic Council of Ministers, 2011).

The scarcity of reliable information on the ICT based learning phenomenon is natural because ICT changes, educations are slow to adapt changes, and contextual variety of technology use in different kind of learning sub-systems (European Commission, 2010). A larger empirical investigation concludes that it is not possible to describe ICT-based innovative pedagogical practice based on one standard set of definitions, since this would leave no room to express its infinite variety (Körös-Mikis, 2009). The field of learning and thereby the *research context* matters. Pedagogic, innovative and ICT-based practices unfold in contexts, which are active entities (Sorensen, 2011; Sorensen, Conole & Harlung, 2011). This matches the European recommendation (European Commission, 2010) for future research in ICT support and IL. Research needs to *proactively* include development of new knowledge based solutions, pedagogies and effective application of learning technologies in

real contexts. Such research involves educational stakeholders (ibid), which in the actual context of further education may be representatives from work-life, teachers and students.

In view of such complexity, how is it possible to gain knowledge that may help and qualify the development of innovative and ICT-based learning designs for the future?

This question is placed in the heart of this paper, which attempts to explore and investigate, theoretically, the characteristics of educational research in the field of innovative and ICT supported learning in further education for welfare professionals. In our opinion, one fruitful key step towards an increased understanding of – and intervention into – this complexity can be taken within a mode2 research paradigm as a starting point (Nowotny, 2005; Nowotny, et. al., 2003). Among others, this paradigm sees the generation of scientific knowledge as something that should be related to real life and sought in “the interfaces” between fields of real life. Furthermore this kind of knowledge is judged qualitatively, not only by producers but also by potential users of the knowledge. In that way, mode2 research calls for interdisciplinary and trans-contextual thinking drawing on multiple theoretical perspectives and a kind of knowledge creation, which is situated in real contexts.

Following the above four challenges for research in the target field we find two design studies, which: 1) are situated in real educational contexts, that are not yet developed, 2) imply that researchers proactively participate in new knowledge based solutions, pedagogies and application of learning technology for IL, 3) include researchers and participants from further education and other stakeholders for whom the new generated knowledge is relevant, 4) identify what emerges and gets developed through the learning process itself.

As a result of this paper’s argumentation we end up proposing a model for meeting these challenges. A model that offers a methodological framework to operationalize and poses useful questions for future educational research in the target field. The model uses the concept of Design Based Research (DBR) (Barab & Squire, 2004) and combines this with Networked Learning (NL). This combination forms the bed for a birth of a pedagogical framework for the learning designs, we want to develop and study. The choice of DBR is made because this approach aims to produce change. DBR takes into account the need for both creation of new learning designs and the need for establishing/developing knowledge generations about the same. The choice of NL in DBR is rooted in our assumption that *connections in and reifications of learning processes* are crucial factors, which potentially can be supported by ICT (www.networkedlearningconference.org/uk & Wenger, 1999). This relates to the target IL context as well as to the proposed mode 2-research process, which includes people and knowledge from different contexts. Furthermore NL’s interest in technology is focused on how to *support and mediate critical and productive learning*. According to the theoretical optic we introduce in this paper, this focus characterizes IL just as NL may be reified as innovative “products” and as visible data, which may potentially offer to researchers insight into the field.

In the following pages we will elaborate on our underlying assumptions, by introducing to the field in focus for this paper and to the theoretical optic that mirrors our pedagogical understanding of the field. This leads on to a presentation of the methodological model mentioned above (figure 1). On the basis of this model and our theoretical optic, we sum up what kind of data and research questions we assess as useful in futures research using the potential of ICT of connection and reification in NL designs. Finally, our conclusion mirrors an attempt to answer the questions central to this paper (p. 2).

An overall view into the target field

The research field of innovative and NL in further education for welfare professionals evolves around learning activities in a “knowledge triangle”. The intention of this triangle is to bring students' professional knowledge into play with the research knowledge used as resources in further education, in order to facilitate knowledge production etc. for innovation in welfare practice.

It is essential that students/professionals within welfare practices are “knowing people” skilled by experience not only from professional practice but also from normal daily life. Therefore, educational research must generate knowledge about learning processes and learning contexts established through ICT, and it must seek to associate the outcome of students' past experience of learning and practices with those of the present, in order to develop new practice-relevant knowledge, models, organizational forms etc. for the future. Thus, there is a need for knowledge generation, which involves a temporal perspective. Researchers must be connected to data, which

gives insight into learners existing knowledge at different times to register change in this knowledge. This temporal point of view is furthermore supported by the fact that the educational programmes in focus in this paper most often are organized as interdisciplinary part-time courses. Wenger (1999) identifies this as a kind of “boundary practice” in an area between research contexts and welfare practice contexts. In such contexts, students act as “knowledge and transfer ambassadors” between their own practice field and the educational context. Across time, students therefore follow learning paths in which they try to bridge the gap from their work-practice context to a scholastic context and back again. The need for knowledge about how this fit together in the IL activities underscores the need for temporal insight. A reification established by NL might offer the opportunities of ICT to “freeze” actions in time and thereby make it possible for researchers to generate data from “the frozen”.

We also find an existing challenge in relation to practice-oriented education. It may be difficult to create transfer of learning, knowledge and artefacts, which are developed in a theoretical based context, into a professional practice context. In connection to that ICT offers bridge-building potential, because net-based technology can create possibilities for overcoming barriers in time and space. The question is how these possibilities can be used in the context of IL for development of welfare practices. Educational research must also make efforts to generate knowledge about NL designs for education and training. This includes challenges of students in open learning contexts to relate to the world and others, for whom the outcome of students learning must be valuable; and work-life partners and citizens for whose sake welfare professionals are working. In other words: reifications from participation in learning processes must be visible to others than the learning community in the educational context.

Theoretical optic

As mentioned before one of the central challenges for educational research is that we still know very little about what constitutes innovative pedagogy, didactics and IL processes (Nordic Council of Ministers, 2011). In addition to this there seems to be quite a bit of ambiguity clarity in terminology. "Thus it is not uniquely defined what may be characterized as innovative, creative and entrepreneurial education. Development of current concepts for an understanding of the phenomenon as well as an open approach provide educators and students with an opportunity to engage in creativity-enhancing understanding of how they may develop innovation competence “ (ibid, p. 50) (our translation). In this section we take up this opportunity by introducing the theoretical embroidery, which underlies our understanding of key concepts in relation to IL.

Creative and innovative competence –a goal of further education

As mentioned above the new ideal of “bildung” in education aims to support students to be creative and innovatively competent through IL and the way learning is achieved. Creative and innovative competences that appear relevant in this paper consist of an ability in a social context to create innovation: consciously create new knowledge, models, organisational forms, processes etc. relevant for welfare practices. It is important to underline that innovation artefacts may be understood as innovations only in situations, where practice-relevant agents – not only students – make use of them, meaningfully, and obtain new opportunities in a social context.

According to Lund (2008) and Rasmussen (2009) the characteristics of a creative and innovatively formed person is a balanced personality with autonomy that can tolerate conflicting elements, and who is not eager to please. A person, who has sufficient self-confidence to take chances and formulate problems of his/her own. An individual, who asks questions about what is given, who wonders and can imagine other solutions, just as he/she looks for opportunities rather than limitations. At the same time - of inner motivation – he/she is able to focus and work hard and targeted to acquire a domain specific knowledge, and may collaborate with others and retreat into self-reflection. Lund (2008) and Rasmussen (2009) are focused on the individual in social contexts.

Cultivating contexts for innovation and learning

Some key qualities of innovation-rich settings are trust and support, freedom to exercise self-control, variety in learning context, balance between challenges and capabilities and ample access to feedback (Rasmussen, 2009). These settings may fruitfully be organized in collaborative Communities of Practices (CoP) (Wenger, 1999) to support creation of meaning in learning processes, which also characterize processes of innovation (Tuomi, 2007). Tuomi (2007) argues that there are 2 ways in which innovative activities may spawn “something new”: 1) through specialisation in-depth, or 2) by combining knowledge from different areas of knowledge, which point to inter- or trans-disciplinary collaboration in these communities. Wenger et al. (2002) argue, that learning and

innovation in CoP are supported by organizational design for “aliveness”. This follows principles of: Open dialogue between inside and outside perspectives, invitation to different levels of participation, development of both public and private community spaces, focus on value, combinations of familiarity and excitement, and a rhythm for the community.

Wenger et al. (2002) have a focus on CoPs and evolution in existing organizations. But innovations might also be more revolutionary. The “new” may be real inventions, but may also consist in a kind of imitations selectively borrowing and creatively copying from the nature or existing cultural artefacts (Godin, 2008). A rediscovery of the old used in another context, eventually in new combinations. Processes of innovation, which lead to inventions, are often named as *radical* innovations, which dismiss the past. Creative imitation or new combination of something known may be part of *incremental* processes of innovation, which run more continuously within well-known frames (Darsø, 2011). According to these kinds of innovations the educational context might then be designed for learning categories, which are more or less transformative, expansive or mind changing - but always productive.

Productive learning processes

Engeström’s theories about Training for change (1994) and his theory about Expansive Learning (1987) appear relevant in relation to creativeness and IL. According to these theories meaningful learning will happen, when new knowledge and new tasks run into and merge with the learner’s activity and former knowledge. In order to support and mediate this type of learning artefacts, other people’s knowledge and explanations etc. are used. Therefore, students must have possibilities to connect to these. The new knowledge, which creative and IL processes aim at creating, can in terms of Engeström (1994) be characterized as “high-quality knowledge”. High quality knowledge manifests itself in production of new insights, which can be broadly applied into practice. High quality knowledge is socially shared and developed through exchange, interaction and discourse between people. Communication and collaboration are crucial aspects of high quality knowledge (Engeström, 1994). From this follows, that connections must be made to share, exchange, interact and form dialogue with others.

The productive learning relevant to develop high quality knowledge is investigative or the more radical expansive learning (Engeström, 1987 & 1994). Both types are supported by “deep-level learning processes”, (ibid) in which students try to reflect and understand the deeper meaning in the discourses of the learning community, as well as in the artefacts, which are employed into the learning design in question. Successful outcome of investigative deep level learning may appear in new tools, models, procedural knowledge, theories, concepts etc. within familiar contexts of practice. Successive outcome of expansive learning will become visible when the contexts themselves are being changed. Viewed in relation to the concept of innovation, it will be possible to talk about both incremental and radical innovation (Darsø, 2011) as output of deep-level-learning-processes.

Facing the challenge of designing contexts for NL processes that support innovation in welfare, it is necessary to design for investigative or expansive learning. ICT appears as mediating artefact for learning, while at the same time it is used to reify the productive learning outcome in new knowledge and artefacts usable for change in welfare practices. Both learning methods are supported and motivated by cognitive conflicts and awareness about these as a substantial motivation resource for learning (Engeström, 1994). These conflicts may occur at more levels, but the most important level related to this paper is that of problems, dilemmas, anomalies etc. seen as challenges for students, while at the same time being meaningful for relevant agents within the welfare domain. In this domain, innovations are expected to create value. Therefore, connections which could support dialogue with representatives from this domain, appear crucial to this kind of learning.

Returning to the starting point – a methodological model for DBR

In the first section of this paper we asked: “In view of such complexity, how is it possible to gain knowledge that may help and qualify the development of innovative and ICT-based learning designs for the future?” (p.2)

To answer this question we propose a methodological model as framework for the envisioned knowledge generation through DBR in NL contexts. The model is based on an earlier work (Østergaard, 2004) and is inspired by Skovsmose’s and Borba’s (Skovsmose & Borba, 2000) educational research theories, theories of learning for change (Engeström, 1987 & 1994) and Social Theory of Learning (Wenger, 1999). These theories underline our view of education as something that should be constructed and reconstructed under continuous

reflection, as well as the view that learning and IL always share an inherent socio-cultural aspect. As seen below, this work of this paper may be viewed as a part of the research processes suggested in the model.

The model below (figure 1) operates with the following concepts:

- *CS - current situation*: described in the introduction to this paper and in the overall view into the target field (first and second section).
- *PI - pedagogical imagination*: the process of identifying imagined/theoretical based key characteristics for innovative and NL designs. In this paper partly described as our theoretical optic (section 3). What lack in this process according to the wanted “knowledge triangle” is participation from stakeholders in educations and welfare practices.
- *IS - imagined situation*: “a picture” and description of key characteristics for the desired educational activity. (Preliminary characteristics are to be found in this section of the paper (figure 2)).
- *PO - practical organisation* - practical design of the educational programme, which should be used in future DBRs as proposed. PO pays attention to the framing conditions in and around the educational context and to the starting point (CS).
- *AS - arranged situation*: the educational programme in situ used as empirical context for DBR.
- *CR - critical reasoning*: Knowledge production in dialogic reflections and evaluation processes to generate mode 2 knowledge; contextual situated knowledge providing opportunity for generalized knowledge or hypotheses.

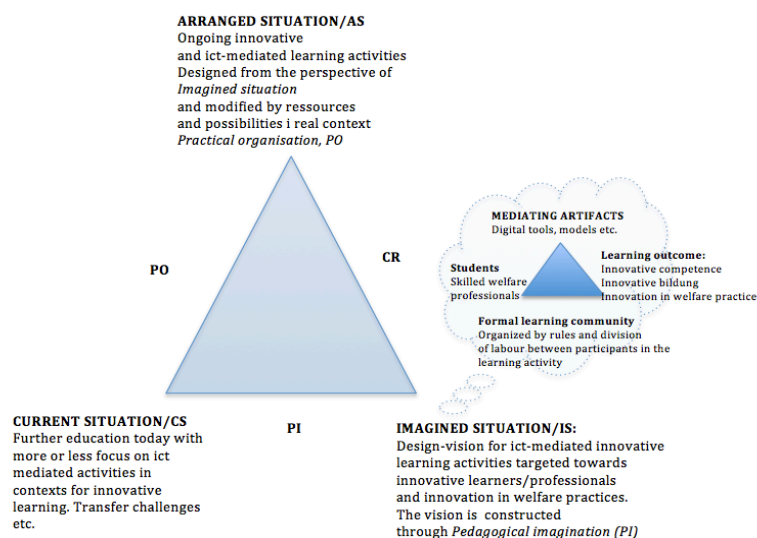


Figure 1: Methodological model (developed from Oestergaard, 2004)

Framed by the model above, DBR takes place methodologically throughout several processes:

A research community of researchers and relevant stakeholders creates – from existing theories, knowledge and wanted learning outcome (PI) - an educational design (IS). The focus areas for the description of the IS are illustrated by the small triangle to the right, which takes its points of departure in Engeström’s activity theory model (Engeström, 1987) and a Wengarian understanding (Wenger, 1999), viewing the concept of “community” as a shared domain (boundary practice) and ICT as mediating artefacts. After creation of IS follows the practical organisation (PO) and systematic experimentations during an IL/NL process in real educational settings (AS).

CR and knowledge generation take place not only after the process has run, but also during the actual NL process where the research community reflect on data generated through participation and net-based reifications of the learning process. This collaborative process of reflection should allow every adjustment to function as an experiment, which in turn allows the researchers to test and generate theory in natural use contexts. In CR a comparison between IS and AS is included. This comparison forms the basis for meta-reflection on the pedagogic used (PI) and the practical organization (PO). In addition, several unpredictable issues in natural use

contexts may appear, which require openness of mind and creation of opportunities for both reifying and iterative implementing the new knowledge, which may emerge. Thus, CR may be described as three correlated evaluation tracks (Oestergaard & Johansen, 2004):

- A) a prospectively planned track with milestones measuring what is the *learning outcome at a certain point in time*, data are momentary images in relation to previously agreed IL goals.
- B) a prospectively planned track of reflection and reification (a track which catches certain types of data to elucidate elements from existing knowledge: catching *change over time* in areas identified in the pedagogical imagination process (PI)).
- C) a process track for capturing observations in unpredictable areas and for generating *emerging* new insights and hypotheses/questions.

The researchers retrospectively incorporate data and reflections from all three tracks in a process of theoretical meta-reflection and new theories, hypotheses, questions, artefacts and practices are produced, which are valuable to both research, learning and teaching in natural use contexts. To qualify the development of learning design for the future, we can obtain further insight into the field by use of the three mentioned evaluation-tracks in combination with our theoretical optic (PI). Data useable in this process include ICT based reifications from participation in NL, which relate to each of the tracks as follows:

Track A: Data, which give insight into the questions: What is the outcome of learning at a certain point in time: students knowledge, innovative skills and competencies, mind-sets and attitudes etc., and what has been “produced” suitable for welfare practices? What in the real learning context seems to have had special impact on these outcomes?

Track B: Data, which might give insight into the questions: What in relation to the real learning context seems to offer significant opportunities in terms of theoretical characteristics supportive for IL & NL in IS? This track is focused on elements from existing knowledge used in the pedagogical imagination process (PI).

The schema below describes the characteristics that we refer to above:

Characteristics for actions, which intentionally should be supported in NL contexts, by offering students opportunities:	Intentional characteristics of a community of shared domain supporting IL & NL - and aliveness
To be challenged and motivated to work focused with determination by cognitive conflicts. To ask questions of any existing, to articulate problems, to gain enough confidence and autonomy to take risks	Has trust and support, freedom to exercise self-control, balance between challenges and capabilities
To both individual and collective reflection and meta reflection on: 1) structures, central concepts and principles behind collaboration practices 2) cognitive conflicts emerged in learning processes 3) learning resources applied in the learning context.	Collaboration inside and outside the community
To work in varieties of learning context.	Inter- or trans-disciplinary work
To be in contact with the outside world to see the world from different perspectives to ensure focus on real problems to be solved, which are valuable for welfare and welfare practices and not oneself only.	Ample feed-back
To gain insight to existing knowledge from research and welfare practices	Works in the interfaces of research and work-life
To create new/prototypes that combine something existing, improve something existing or include something from one context to another where it is normally not used. To experiment with these prototypes in contexts which are similar to real-life contexts.	Allows students to be “prosumers” and “knowledge and transfer ambassadors”
To become innovative	Supports innovative “bildung”: following and adjusting communication according to “rules” that value imagination, openness against what is different, fantasy and creation of the new and unexpected as well as knowledge of what exists, looking for opportunities rather than limitations.

Figure 2: Characteristics for Imagined Situation (IS)

Track C: Data, which emerges as important in the research community including (peripheral) participation from stakeholders in further education and welfare practices.

We find that the above opportunities and questions may be taken into account in the use of ICT to connect: people of different kinds from different contexts, students to multi-modal resources and knowledge, teachers to

knowledge about students reflections, knowledge, skills, students and teachers to each other in virtual dialog and collaboration, researchers to other stakeholders, researchers to data/reification from NL. This underscores the assumption that NL environment can offer useful contexts for creative and IL and –“bildung” in further educations related to welfare practices.

Conclusion and discussion

The ambition of this paper was to explore and investigate, theoretically, the characteristics of educational research in the field of innovative and ICT-supported learning in further education for welfare professionals.

We posed the question: “how is it possible to gain knowledge that may help and qualify the development of innovative and ICT-based learning designs for the future?”

The authors of the paper have posed the suggestion: a marriage between NL and DBR providing opportunity for meeting the educational need of participation, mediation, connection and reification within the domain of IL and Mode 2 development through educations. Such marriage will promote development of data for research. A model for learning design was presented as a methodological framework for DBR in the field, and as a tool for pointing out the type of data and questions that are likely to become useful for critical reasoning (CR) - and, as such, in an IL optic appropriate for research. What remains is an opportunity to differentiate between various technologies suitable for use in futures DBR and NL designs.

According to the IL work of this paper, processes in further education for professionals include learning contexts, which open up towards the changing world outside small learning communities. Accepting the views put forward here, researchers addressing the field as well as welfare professionals in pedagogical, social and health areas must display creative and innovative competences. – In general, research findings are needed, that are generated and validated through their iterative use in real life settings.

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