



Nursing students' attitudes towards ICT in education and clinic in Denmark.

Raymond Kolbæk

Center for Nursing Research-Viborg
Regional Hospital Central Jutland
&
Faculty of Health
Via University College
E-mail: raymond.kolbaek@midt.rm.dk

Abstract:

It is well known that in an era of emerging use of ICT in nursing education and health care it is important to have knowledge of the attitudes towards ICT within the profession. However, nursing students and nurses have been notoriously reluctant to embrace/implement ICT in their work and studies.

This paper focuses on the construction of ICT-habitus amongst bachelor nursing students displayed by four positions of attitudes that describe the ICT-habitus of the group of nursing students included [under consideration] in the study. Quotes from the students are used to support and illustrate the findings. The methodical approach was based on Pierre Bourdieu's multi-faceted data collection approach and Steiner Kvale's technical guidelines for interviewing were used for conducting focus group interviews.

In order to carry out the construction a mapping of ICT implementation in the Danish primary and secondary education and nursing education from 1970 – 2001 was undertaken. A questionnaire concerning attitudes towards ICT in Healthcare was conducted amongst first year students and focus group interviews were completed. A bibliography and other sources has been included. These datasets made it possible to construct the field of ICT in nursing education and +to construct nursing students' ICT habitus and ICT capital, which was were categorized in four descriptive positions, called "The endorser", "The sceptic", "The adversary" and "The critical".

These positions can be used for developing strategies for implementing ICT and development of e-learning in educational and clinical settings for nursing students, thereby contributing with new knowledge and understanding of the ICT-based learning context and the processes within.

Keywords: Bachelor, student nurse, attitude, ICT, education, resistance, habitus, field.

Introduction

It has been reported, that nursing students and clinical nurses in Denmark throughout times have been reluctant to embrace ICT¹ for the purposes of work and study. It is a part of doxa² in the field of nursing (Dansk Sygeplejeråd, 1981), (Bottrup & Nielsen, 1986), (Kolbæk et al., 1998), (Krüger,

2003), (Teknologisk Institut, 2012) Further, personal experiences³ when lecturing on Health- and Nursing Informatics to nursing students and nurses supports this towards use of ICT in their studies and clinical work.

While it is important to consider the conditions for leaning with technology, it is also important to focus on the learners who use ICT in their studies in order to obtain a more complete picture of the learning field. Very few studies have focused on how nursing students' attitudes towards ICT in educational and clinical practice, either in Denmark nor internationally.⁴

It is commonly believed that students' initial attitudes towards the use of ICT in education frames the way technology is used to enhance learning. It also affects how learners accept the media based education through which learning is delivered. Moreover, it has a bearing upon the way learners thinks about and use, or do not use, technology in their learning efforts and afterwards in their professions.

This paper focuses on the construction of ICT-habitus amongst bachelor nursing students as displayed by four positions of attitude that describe the ICT-habitus of the group of nursing students included in the study. Quotes from the students will be provided to support and illustrate findings.

Method

The research was divided into five independent parts, each of which contributed to the construction of the four positions of ICT-habitus. The theoretical and methodical setup was inspired by the methodical approach to the multi-faceted data collection approach established by Pierre Bourdieu (Bourdieu, 1999), (Callewaert, 1998). The method of setting up an interview has been based on Steiner Kvale's guidelines, which provided a practical guide for carrying out focus group interviews. (Kvale, 1997), (Glasdam, 2007).

This theoretical lens allowed to construct the field of "ICT in Nursing Education" and to construct the positions of the students expressed during the interviews by means of four habitual ICT positions.

The first part comprised an investigation and description of ICT implementation in the Danish educational system, with a focus on ICT in primary and secondary upper schools followed by an investigation and description of the implementation of ICT in the nursing education field during the period 1970 – 2001. These parts will not be discussed further in this paper.

The third part comprised the bibliographical research. The search were focused on published papers on health care student's attitudes towards ICT from 1992 to 2012. The results were poor. Only four reports had been published in Danish (Kolbæk et al., 1998, Uggerhøj, Nyvang & Kjeldskov, 1999, Krüger, 2003, Teknologisk Institut 2012) and the international literature likewise yielded few studies on students' attitudes (McVeigh, 2009, Samarkandi, 2011).

The empirical part of the project was carried out at three Danish nursing schools. A small, a medium- sized and large nursing school, two of which were located in Jutland. The third one was located in Zealand. In all schools, the type⁵ and physical placement of ICT were mapped and registered in line with the concept of Bourdieu's description of the Kabylean House in the book "Masculine Domination" (Bourdieu (1996). This mapping showed two interesting patterns. All three schools in which ICT equipment was accessible for students to use were situated far away where the students were taught and

the ICT was to be found in libraries, rather than classrooms. The second patterns showed that all new ICT equipment had first been bought for use in the school's administration and when this equipment became outdated for administrative use it was then available for use by teachers and students in offices and in rooms for group work. It was concluded, that ICT was not implemented in nursing schools for pedagogical and learning purposes but primarily for administrative purposes, although learning and teaching are the core activities.

All 205 first year students who had enrolled in spring 2002 at the three schools were included and invited to participate. From this group 23 students volunteered to take part for a focus group interview. Those students gave the researcher permission to read their admission applications prior to the focus group interviews. The data from this reading was used to help mapping their socio-economic background as a group and their reasons opting for nursing. One distinctive pattern to emerge was that all 23 students, both males and females, stated that they wanted to become nurses to work with and help people.

Shortly before the focus group interviews began, the informants were asked to fill in a questionnaire regarding their attitude towards ICT⁶. The results were processed immediately before the interview and were presented to the students at the warm-up stage of the interview. During this initial stage, the students were asked whether the results were a source of surprise. This issue gave rise to a lively discussion in all five groups for the next two hours. The interviews were recorded on digital media. After completion of the interviews, the informants were handed a stamped envelope with a questionnaire about their socio-cultural background.⁷ The remainder of the students were handed the two questionnaires in class and told to hand in the questionnaires to a member of the teaching staff within a timeframe of fourteen days. After the last interview had been carried out, each interview was transcribed using Express Scribe Free⁸ and subsequently converted into Microsoft Word.

After these tasks were completed, the construction of the ICT educational field from the primary- and secondary upper school sector and in Nursing Education began. This was based on a comprehensive numbers of contemporary current sources as policy papers, ministerial orders, reports and minutes from meetings from the period of 1970 to 2001. This phase of the construction consisted of identifying and combining patterns in those sources.

The next step was to analyse the data from the questionnaires. This was carried out by performing simple statistical operations as percent calculations with Microsoft Excel and the use of tendency analysis in Excel. The tendencies were then expressed as written statements, which also were analyzed for concordant expressions. A thematic analysis of the transcribed interviews was performed by using nVivo.⁹ The results of the analysis formed one part of the empirical basis for the construction of the students ICT-habitus.¹⁰

Bourdieu finds that interviews can be seen as an interaction between two or more agents in possession of various types of capital and symbolic goods to varying degrees, not least linguistically. However, it is not only the linguistic capital that determines the success of an interview. Further aspects to be considered are the agents' total social capital, which include gender, age, economic and social status. Also relevant to these interviews, is ICT-capital status, which plays a crucial role in the ways participants express their hopes, beliefs, dislikes and ICT competencies in the discussions. It is simply not possible for individuals to figure out their own practices. Thus, what is at play here goes beyond what each individual might comprehend, or reflect upon, alone. The individual is able to comprehend or reflect himself. Bourdieu does

not discuss the validation of the informants' stories; he limits his comment to understanding what is being said from the informant's standpoint with all the possible inherent ambiguity. It is the researcher's task to consider this asymmetry. The researcher must also consider the purpose or aim of the methodological construction work -which is to minimize the possible symbolic violence included - but it goes without saying that it cannot be eliminated. Moreover, it is of paramount importance that the researcher constructs the content of the informant's statements based on a systematic knowledge of the objective conditions for reflection and actions common to all the participants in the category. These elements led to the construction of four types of ICT-habitus.

Findings

The field of ICT in Nursing Schools in Denmark showed diverse patterns, yet some of these were nevertheless relatively clear-cut and differed little. One of these patterns as mentioned above was that the implementation of ICT started in the administrative environment at the nursing schools, and from there slowly spread into the educational environment, classrooms and offices of the teaching staff. No one in the funding bodies understood that nurses should be able to master ICT in their clinical work therefore; there was no reason to implement ICT in the educational settings. Another finding was that the students entered nursing schools with fewer ICT-competencies than those of their fellow students. It should be remembered that the majority of the students enrolled had a linguistic- or HF-based¹¹ secondary school background. The field analyses demonstrated that ICT competency requirements for students with the linguistic secondary and HF grades were not as extensive as it was the case for the mathematical-, business- and technical secondary lines subjects.

Moreover, the research showed that the requirements for those ICT skills that the students had been taught in secondary linguistic/HF were not as demanding in the subjects they had been taught, whereas in the case of other secondary directions in the same subjects these requirements were more exacting.

This helped to explain the ICT habitus of the students. An updated count from KOT¹² shows that the educational backgrounds for nursing students from 1996-2008, had been stable over the years up until 2008, as the table below shows.

Qualifying entrance exam background for nursing schools 1996-2008						
	1996-2000		2001-2005		2006-2008	
	N	%	N	%	N	%
Secondary linguistic/HF	6414	51	6370	49	3602	47
Other secondary directions*	4233	34	4401	34	2585	34
Other background	1910	15	2288	18	1521	20
	12557	100	13059	100	7708	100

Table 1: Number of students with different Routes

Another finding was the unwillingness to provide financial support from politicians and civil servants. They were prepared only to give very limited or were unwilling to provide financial backing to the implementation of ICT in nursing education.

The regional authorities that were responsible for the administration of nursing schools also governed the secondary school sector, and were ordered by ministerial decree to financially support the implementation of ICT in secondary upper schools. At stake, here was a specific economic view of the nursing profession a viewpoint that was underpinned by a gendered logic given that nursing is a predominantly female area of domain. The analysis showed that the field was characterised by conflicting views on the impact of ICT implementation. There was a clear contrast between the perception of the nurses "warm hands" and the "cold technology."

The data analysis also showed that all informants expressed both in their application forms and during the interviews that they deliberately had opted for nursing in order to be with people and to help others - not to work with technology. As one informant put it:

"The choice felt on the idea of studying nursing pretty quickly because I really wanted to work with people" (Informant)

With the passing of time, the tendency changed from considering ICT as a threat to nursing; in 2002, the field painted a vision of ICT as a medium that supported the day-to-day nursing work as a useful tool, but otherwise ICT did not affect the question of joining the nursing profession and ICT not was an attraction for students.

"Well I think it is a useful tool when you start to work as a nurse."
(Informant)

In 2002, it became clear to the informants that the boundaries of physical contact between nurse and patient was about to change; furthermore, the risk of impersonal interaction was seen to increase with the concomitant risk of conflict between a caring ethos and technological logic.

"Err no; you shouldn't avoid personal touch and contact. If that were the case then much of nursing would disappear, I think. You cannot look after patients just by appearances. (Informant)

However, the informants also found that ICT had potential as a communicative tool that could enhance and improve information channels with older patients and citizens.

" You ought be aware of the patient and remember that the care of the patient is what it is all about. This is not about ICT. OK, ICT can be there too, because it takes less time to put some notes into the computer than it does to sit and write notes by hand in the nursing record." (Informant)

Remarkably few informants considered themselves either computer-literate or literate ICT users. Indeed, they saw themselves as 'ignorant ' when confronted with questions about matters of computer technology, handling programs and how the Internet works.

"Then he asked me about my Window operation system I could see on the screen. I had no idea what kind of system I had. It was something my brother had set up for me and that was it ... And as for things like creating files and folders and moving around? I have no idea."
(Informant)

As is evident from the data and analysis from the two questionnaires, the NIGHTINGALE data and the data from the field of ICT in nursing education,

there were some consistent patterns. It was therefore possible to construct the ITC-habitus of the participating students shown as four positions.

The four constructions or positions/types of students were "The endorser", "The sceptic", "The adversary" and "The critical".

Distinct characteristics were evident in all four positions. The endorser and the adversary were in particular a measure for the opposing views and the sceptic and the critical stances shares some of these views.

The endorser position shows an optimistic belief that ICT-based strategies create greater equality, makes learning fun and serve as patient support technologies. The ethos was one of "the more the better". ICT is only a tool. This was the position held by the most experienced ICT-users whose awareness was extensive. They possessed ICT +and made frequent use of it

"It is almost indispensable". "ICT is an aid.", "It is a typewriter", "It is all sorts of fun". "It's smart, you can download assignments and there's no need to carry around all those papers, because they come directly from the teachers into the websites."

Both advantages and disadvantages of the new technologies were evident in the sceptic position. While they were not against ICT implementation in education and clinics, this position expressed a balanced view according to which ICT should serve a purpose beyond its technical advantages. For the advocates of this position, ICT represented more than a neutral tool since it affects work conditions and when implemented raises a cluster of questions. Further, advocates of this position were aware of the lack of ICT competences, while being fairly experienced and aware users and owners of ICT.

"We are not yet familiar enough with it and we don't use it properly or to its full potential. And neither do I do have enough knowledge to permit me to teach myself something new about computers, if you know what I mean? I couldn't even dream of learning to make folders on the computer and things like that. But it could be good if you learned how to use it, then you could just go in and watch Internet videos and things like that. And that would be really motivating.

(Informant)

The critical position shares a similar view to that of the sceptic position, but expresses a more offensive approach to ICT. Now that the technology was in place, it has to be used properly and exploited to the full. It was underutilized in both clinical nursing and in education. Advocates of this position were also fairly experienced and aware users and owners of ICT.

"The school should give access to computers in exam situations and it's a shame that the teachers do nothing to promote and encourage us because it could really be a great help. But it means that teachers have to know how to use it."

The adversary position was the most authentic. It found ICT to be a time-consuming and an inappropriate form of communication that lead to robotic and inhumane future scenarios. As an adversary puts it:

"If so much ICT is going to be used in hospitals, it will be about robots and sitting in front of computer screens the whole time and there won't be any room for talking to patients about how they feel, so I think people

will get depressed and have other disorders, because there will be no space for people to talk together or be there for each other." (Informant)

Advocates of this position avoided the use of ICT in their private life and did own neither ICT nor mobile phones themselves. If they needed to use ICT, they borrowed it from family or school.

As the research took place over a ten-year period, some vertical patterns of development and implementation stages of ICT in the schools of nursing in Denmark were revealed. These findings should be regarded as patterns that reflect the ICT field in nursing and the tension between the attitudes of the two positions towards ICT; ITC represents both a threat to care in clinical nursing and a productive tool for developing modern nursing and modern education. Moreover, it is the tension between a caring ethos and a technological logic homologue to a gendered male and female logic that is reflected here.

The digitization of society (Frønes, 2002) and the education system is emerging as a key driver behind students' increased ICT usage. This should not be misconstrued as a precondition that students today have acquired specific increases in their ICT skills. Access to, and information about, ICT is only regarded a prerequisite for learning to use ICT as a study tool and a professional tool in nursing - not as a life skill. It is possible to conclude that some external factors have changed and that these have affected the ICT habitus and ICT capital of the four positions: "The endorser", "The sceptic", "The adversary" and "The critical". Some of these factors are illustrated in the chart below:

		Differences and similarities 2002 and 2012	
		2002¹³	2012¹⁴
Hardware	Laptop	Few in possession of laptop	Many possessed one
	PC	Many had one	Few possessed one
	Tablet PC	Did not exist	More possessed one ¹⁵
	Smartphone	Did not exist	Many possessed one
	Mobile phone	Many possessed one	Few possessed one ¹⁶
Software	Social media	Did not exist	"Everyone" uses them ¹⁷
	Programs	Installed at the machine	Used from the Cloud ¹⁸
Gendered behaviour		Female students have men to take care of technical and software issues	Female students have men to take care of technical and software issues
ICT-user rate		Low use rate	Higher use rate (especially social media)
Educational background		Mainly linguistic/HF-background	Mainly linguistic/HF background up to 2006

The four positions reveal conditions, situations and backgrounds that are empirically recognizable today. The empirical findings are both relevant and they represent a high degree of explanatory power and usefulness in the nursing education field. It should nevertheless not be forgotten that there are elements in society that are more rigid and resistant to changes in ICT habitus and ICT capital, the gender issue being a case in point, since the maintenance of technical parts is still largely the task of men. A recent study of Danish high school pupils (Mathiasen, 2011) showed that there was a correlation between gender and self-awareness in one's ICT skills. More than half of the boys felt that their own skills exceeded average skill level, while this was true of only one-sixth of the girls. By contrast, four-fifths (80%) of the girls were found to be about the average level.

			What is your gender?		Sum
			Male	Female	
How hard is for you to use ICT compared with your classmates?	It is harder for me to use ICT than most of my classmates	Answers	4	9	13
		% of gender	2,2%	3,8%	3,1%
	I use ICT at the same level as my classmates	Answer	83	191	274
		% of gender	46,6%	79,6%	65,6%
	It is easier for me to use ICT than most of my classmates	Answer	91	40	131
		% of gender	51,1%	16,7%	31,3%
Total	Answers	178	240	418	
	% of gender	100%	100%	100%	

Table 2. Correlation between gender and experience of own ICT skills (Mathiasen, 2011 p. 84)¹⁹

The study reveals a picture in which the pupils seem to manage the tools and it the boys who feel more prepared than the girls do. It is also worth pausing to consider that the pupils' own experience of being competent users of ICT tools contrasted to a significant extent with the teachers' experience of having to fight to get them to acquire them as "digital natives" in their use of CT tools.

Future considerations

The forgoing gives rise to one question in particular: "Can anything be predicted about any impact on current and future nursing students' ICT habitus and ICT capital from the recent Secondary School Reform of 2006?"

The way in which ICT skills among nursing student have evolved since the school reform in 2006 has yet to be explored. The wide range of optional subjects, which require vastly differing ICT skill levels, will play a significant role. Student nurses will bring ICT skills with them into their nursing studies, when students who are applying to nursing schools can only choose between C and B-level subjects.²⁰

In the governing documents regarding directives on secondary school²¹ ICT skills are not explicitly mentioned. ICT requirements are, however written into the individual curriculum²² of each subject and the associated guidelines for teachers.¹⁸ UNI-C²³ has made many of the teaching guidelines available online as a source of inspiration for ICT integration.^{24, 25}

These requirements vary dramatically from subject to subject. For example, in the Science and Mathematics curricula it is stated that ICT forms an integral part of the subject, including communication, data acquisition, data processing, modelling, visualization, simulation and information retrieval.

In the curriculum subjects in the Danish language, considerable thoughts should be given to the inclusion of within the context of teaching on writing. It would also be advisable to consider its implementation in work where oral presentation is supported by technology, in information retrievals well as work with texts that are unavailable in printed format. This includes specific digital tools and virtual collaboration.²⁶ In language courses, such as Greek, it is forcefully stated that students must familiarise themselves with classical resources. They must also learn to use web-based tools. Furthermore, those pupils who have Greek at a high level possess a high level of expertise in Greek just acquire competence in using virtual tools.²⁷

The Social Science syllabus (C- to A-level) includes simulation of economic relationships, the ICT-based data collection of empirical data and integration of electronic conferencing software in its learning. It also includes the use of online macroeconomic calculation models, web-based collection of empirical data, the development of spreadsheets charts and publishing on the web.

With such a diversity in the ICT competencies of future students and their ICT-habitus it is possible to hypothesise that the background in ICT skills of future nursing students will far more variegated than is presently the case. Whether it leads to a change in ICT-habitus and ICT-capital, such as increased ICT skills among the students as a group has yet to be seen. Without further research, it is possible only to speculate on changes in ICT etc.

It is legitimate to consider whether the findings and the four positions of ICT-habitus and capital are still relevant in 2015. The answer to this question is in the affirmative.

Even though these positions have not been investigated scientifically, their enduring relevance is nevertheless evident in classroom observations, online behaviour and dialogues with colleagues and nursing students, all of which have occurred since 2002.

The dialogues were held with first year nursing students during the completion of several Modules.²⁸ The dialogs were also conducted with first year students enrolled in the ICT introduction course (Module 1), second year students on the Health Informatics course (Module 5) and third year students who were following a course on research *into* nursing, its theories and methods. (Module 9)

The ICT-habitus and ICT-capitals of the four positions, "The endorser", "The sceptic", "The adversary" and "The critical" is still recognizable for this author, and also for current students, as they can identify, to some extent, with aspects portrayed in the four descriptions as recognize traits from themselves in the four descriptions. The students respond by giggling embarrassment and "good" explanations as to why they let males carry out the more substantial work with their computers, printers, smart phones and internet access. However, what has changed is that today's students make more extensive use of ICT than was previously the case.

Whether nursing students of today can be considered as digital natives is open to question.

Clearly, there is scope for further research into the use of ICT in educational settings and clinical nursing.

The following conditions serve to illustrate this:

1. Digital natives have integrated digital technology into all aspects of their lives
2. As a result of their upbringing and experience with digital technology digital natives have considerable competence in skills in ICT
3. Digital natives are the new content creators and heavy users of Web2.0 technologies.²⁹

Marc Prensky introduced the term "digital native" in 2001.³⁰ (Prensky, 2001) He described a generation of young people who were born in the mid-1980s into a world where digital technology was the norm. Since they had never known a world without digital technology he thought they might have a deep intuitive understanding and knowledge of how digital technology was used. It was believed that their ICT habitus and ICT capital was advanced in relation to the digital 'immigrants' who were born earlier than mid-1980's.

Recent studies suggest that the vast majority of young people in western societies cannot be said to belong to the "digital natives", when measured by the number of different technologies they use, the extent of use or whether they are not just consumers, but also creating digital content. (Ryberg, 2009, 2012), (Eduardsen, 2011)

From a contemporary professional perspective the findings from a recently completed research project, titled *Technucation*, is interesting.³¹ The project focused on developing a concept for understanding technology in the nursing and teaching professions. Tools were also developed for implementing this concept into the education of teachers and nurses.³² The project comprised a study of the attitudes of student nurses and teachers towards new technology as well as their assumptions on the subject. The findings of this project were subsequently published. (Teknologisk Institut, 2012) This study included very similar questions to those asked in 2002; it was therefore highly suitable as a longitudinal update from 2002 to 2012.

They found that the majority of nursing students felt confident using new technology in their studies but generally, they felt insecure and less confident when using technologies in a clinical setting. Four percent of the respondents declined to use available technologies for their own study and in clinical practice. This group exhibit features from the Adversary position. 68% and 81% agreed or strongly agreed that the use of new technology helped to develop the nursing profession, improve dissemination of knowledge, and enhance themselves as professionals. It was found that 57% felt that ICT was a prerequisite for improving patient care. These respondents exhibit features of the Embracing category. 17-21% considered new technology a barrier to the successful delivery of nursing. They thought that ICT shifted the focus from the core professional skills. 35% were of the opinion that new technology meant there was less time for carrying out nursing, and thus the use of ICT was considered unduly time-consuming. These respondents share traits with the Sceptic and Critic categories.

It is possible to draw the tentative conclusion that there has been a positive development in nursing students' attitudes towards, and use of, ICT in some aspects of their lives.

Moreover, greater use is made of ICT and more nursing students now possess it, but they are not to be considered as digital natives. Thus, the construction of the four positions is likely to last but these are not mutually exclusive

positions. Rather than being immutable/fixed categories, they should be regarded as analytical positions, which enable us to understand the ICT-habitus and ICT-capital of students.

Over time there will be shifts and even convergences in these positions and the boundaries of the positions are likely to become blurred, but given that four percent of the respondents in the 2012 Technucation survey still preferred to avoid the use of technology in learning and clinical practice, there is no reason to believe that this position is on the wane.

It is probable that change in the positions, and indeed in society, will come about slowly. Such changes cannot be attributed to the dissemination of ICT, but rather to a modification in mindset that will be receptive to ideas such as the best way to perform nursing as well as the conditions under which nursing should be understood and practised.

Knowledge of the four positions can be used to identify nursing students with traits from the sceptic and opponent positions and support these students in mastering and using ICT in their study and clinical work. It can also help to identify students possessing traits from the endorsers' position. In order to foster these students' skills of critical awareness of ICT implementation in education and healthcare.

If nursing students wish to work with people and for people, in the future they have to get to grips with ICT, because increasingly it is being integrated into everything to help us make the best choices in our daily lives and in our excessively demanding professional work.

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About the author:

Ph.d., (MsN), RN Raymond Kolbæk is a Research lecturer. He has worked with the impact of ICT in Nursing and in education for almost 30 years. His area of expertise concerns the impact of digitalization of Nursing in hospital settings at the Regional Hospital in Central Jutland. Another area of interest is the transformation of the nursing curriculum from a traditional paper-based one to a blended online setup of VIA, Health - Nursing education.

¹ ICT is the acronym for Information and Communication Technologies. This also includes new digital technologies.

² Doxa is the concept for a position or rationale which involves a certain perception of reality prevailing in a field at any given time.

³ By the author of this paper.

⁴ Kolbæk, R. (2013). Holdninger til brugen af it i teoretisk uddannelse og klinisk sygepleje hos nystartede sygeplejestuderende. (First year nurse students' attitudes towards the use of ICT in theoretical education and clinical nursing.) University of Copenhagen, Copenhagen.
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⁵ Type of equipment, age, programs installed, access to internet, access to printer.

⁶ This questionnaire was developed and validated in the EU project NIGHTINGALE (Nursing Informatics: Generic High-level Training in Informatics for Nurses, General Applications for Learning and Education.) The project website is available at <http://web.archive.org/web/20001202043600/http://nightingale.dn.uoa.gr/>

⁷ The questionnaire was developed and validated by the Bourdieu program in Viborg led by prof. Staf Callewaert, to be used in other comparative projects about other semi-professional conditions such as teachers, pedagogues and nurses (Olesen, 2005), (Steensen, 2007), (Halskov, 2013).

⁸ Express Scribe Free is a audio player software for PC or Mac designed to assist the transcription of audio recordings. <http://www.nch.com.au/scribe/>

⁹ Nvivo is a Computer Assisted Qualitative Data Analysis Software (CAQDAS) tool. http://www.qsrinternational.com/products_nvivo.aspx

¹⁰ To do a preliminary construction of a field will in this context means those players from the field, their relations and interactions become known, so they are visible to the researcher and the reader.

¹¹ HF (Higher Preparatory Exam) HF-exam belongs to upper secondary education, which (like STX, HHX and HTX) provides access to the higher education. Unlike other aspects of modules in secondary education, HF candidates are required to complete HF by the 10th grade. HF can be organized as full-time training over 2 years or as single units. (<http://ufm.dk/publikationer/2011/the-danish-education-system>)

¹² The central coordinating registration agency.

¹³ No data exists from 2002.

¹⁴ In 2011, there were computers in 90 %, smartphones in 33% and tablet-pc's in 9% of the Danish households, as 90% had access to the internet, by which 84% of whom had broadband access from their home. (Danmarks Statistik, 2012)

¹⁵ More than 25 million tablet computers were sold worldwide in the second quarter of 2012, an increase of 66% relative to same period in 2011. Meanwhile, sales of laptops stagnated and sales of desktop PCs has decreased 2% back since the first six months of the previous year. (Jyllands-Posten Online August 13, 2012)

<http://m.epn.dk/teknologi2/computer/article4806468.ece>). Every fifth family had a tablet or minicomputer; four out of five had a laptop. The proportion of families who had a desktop computer fell from 2010 to 2011 from 30 to 24%. During the same period, the proportion of very small computers, handheld computers, such as PDAs increased significantly from 6% to 10%. (Statistics Denmark 2012) These figures show a similar trend to that seen among Danish nursing students in 2012.

¹⁶ 98 % of the population between the ages of 16 and 44 possess and operate a mobile phone. (A distinction is made between ordinary mobiles and smartphones with internet access) (Statistics Denmark, 2012)

¹⁷ 65 % of the Danish Internet users were linked to a social networking service. (Statistics Denmark, 2012)

¹⁸ The Cloud is the name for web2 technologies where data processing is done online in real time on the web.

¹⁹ Translated into English by author of this paper.

²⁰ The Danish online educational guide Are these guidelines?: <http://www.ug.dk/uddannelser/gymnasialeuddannelser.aspx>

²¹ <https://www.retsinformation.dk/Forms/R0710.aspx?id=132647#B8>

²² <http://www.uvm.dk/Uddannelser-og-dagtilbud/Gymnasiale-uddannelser/Studieretninger-og-fag/Studentereksamen-stx/Laereplaner-paa-stx>

²³ UNI-C is the Danish National Center for Computers in Education. OK?

²⁴ <http://www.emu.dk/gym/projektarbejde/medit/>

²⁵ <http://www.emu.dk/gym/fag/if/dl/inspiration/index.html> and <http://www.emu.dk/gym/fag/if/index.html?gymR=stx>

²⁶ http://www.uvm.dk/Uddannelser-og-dagtilbud/Gymnasiale-uddannelser/Studieretninger-og-fag/Studentereksamen-stx/~media/UVM/Filer/Udd/Gym/PDF10/Vejledninger%20til%20laereplaner/Stx/100622_vejl_dansk_stx.ashx

²⁷ http://www.uvm.dk/Uddannelser-og-dagtilbud/Gymnasiale-uddannelser/Studieretninger-og-fag/Studentereksamen-stx/~media/UVM/Filer/Udd/Gym/PDF10/Vejledninger%20til%20laereplaner/Stx/100629_vejl_graesk_A_stx.ashx p. 16-18

²⁸ In Denmark, nursing education currently comprises 14 modules, each of which is 10 weeks in duration.

²⁹ Jonas Eduardsen: <http://www.slideshare.net/NextGenMarketing/er-de-digitale-indfdte-myte-eller-virkelighed>

³⁰ An American writer and ambiguous designer of digital games.

³¹ TECHNUCATION: Technological Literacy and New Employee Driven Innovation through Education

³² The project combines ethnographic field studies in schools and hospitals with experimental Living Labs. It is a collaboration between several Universities, University Colleges and international educational researchers (www.technucation.dk)