What is the motivation of Norwegian and New Zealand teacher educators for using digital technology when teaching?

Siri Sollied Madsen[1]

UiT the Arctic University of Norway

Abstract

There is a gap between policies regarding the use of digital technology in higher education in Norway and what is practiced. Therefore, we have conducted a comparative study of teacher education in Norway and New Zealand. Using Herzberg's two-factor theory, this study investigates what motivates teacher educators to use digital technology when teaching. Although the professional application of digital tools is more frequent in New Zealand than in Norway, the ability to use digital technology seems to be greater in Norway than in New Zealand. Based on Meier's formula (performance = abilities × motivation), teacher educators' performance is considered a result of their abilities and motivation. This indicates that motivation is a key element in understanding why the use of digital tools is more frequent amongst New Zealand teacher educators. When explaining their motivation for using digital technology, Norwegian teacher educators mentioned nine motivation factors and nine hygiene factors. The hygiene factors relate to the mandatory policy and the work conditions when teaching online. New Zealand teacher educators explained their motivation with 14 motivational factors and only four hygiene factors. New Zealand teacher educators seemed to be more motivated to work with digital technology than their Norwegian counterparts. This lack of motivation is one reason that could explain why the application of digital tools seemed lower in Norway than in New Zealand. Norwegian teacher educators explained that the main reason they use digital tools is the top-down implementation of government policy. Therefore, a fundamental challenge in the use of digital technology in Norway is the policy related to its implementation; as a part of the job environment, policy creates job dissatisfaction. Teacher educators from both countries highlighted achievement and policy as their main reasons for using digital technology, but Norwegian teacher educators were especially critical of their own country's policy.

Keywords: digital technology; motivation; teacher education; two-factor theory; theory of action

[1] Corresponding author: siri.s.madsen@uit.no

Introduction

Auerbach (1967) foresaw the digital revolution more than 50 years ago. He described it as being underestimated and claimed it was a technological inevitability. For the last three decades, researchers, policy makers and educationalists have all harboured great expectations for the use of technology, and the technological revolution has had a global impact on the field of education. This article investigates the motivation of Norway and New Zealand teacher educators for using digital technology when teaching. Despite being on opposite sides of the globe, Norway and New Zealand have been facing many of the same challenges in education policy. Both countries must educate student teachers in digital-rich environments, as both have for many years been teaching students with high access to various information and communication technology (ICT) and educational resources at home (Organisation for Economic Cooperation and Development [OECD], 2010, p. 95). The policies of both countries emphasises digital technology as a foundation for learning. When it comes to the two countries educational systems, the structures are somewhat similar from preschool to secondary school (see Table 1). All children aged 6–16 in both countries must either attend school or be educated at home (New Zealand Government Immigration [NZGI], 2020; Utdanningsdirektoratet [Udir], 2013). Both countries have been rated above average in terms of reading, arithmetic and science (OECD, 2015).

Table 1: Norwegian and New Zealand school structure

Norway:		New Zealand:	
Barnehage	0–5 years	Early learning services	0–6 years
Barneskole, (year 1–7)	6–12 years	Primary school (year 1–8)	5–12 years
		Intermediate (year 7–8)	11–12 years
Ungdomskole, (year 8–10)	13-15 years	Secondary school (year 9–13)	13–19 years
Vg1–Vg3 (year 11–13)	16–19 years		

Source: NZGI (2020), Ministry of Education [MoE] (2020c) and MoE (2020d).

However, a noticeable difference is that the two countries have different implementation strategies when it comes to digital technology in education. Norway has been exposed to a stronger top-down educational implementation of ICT in schools than have other countries (Krumsvik, 2014). In accordance with the national curricula, Norway and New Zealand have programs for educating pre-service teachers. Teachers and teacher educators in New Zealand have not been subjected to the same political pressure to implement digital technology in education; where the Norwegian curriculum regarding digital technology

is mandatory for all subjects and levels in schools, the New Zealand curriculum is more suggestive in its formulation. The New Zealand way of implementing digital technology in education is based on words such as 'should' or 'could' (MoE, 2017). The use of digital technology is not as explicitly implemented in the curriculum there as it is in Norway (Madsen, 2020; Madsen, Archard, & Thorvaldsen, 2018). The two universities in this study have a somewhat similar view on digital technology and have somewhat similar structures within the university to enable educators to teach using digital technology. In general, both universities have a focus on digital literacy and supporting staff in developing digital literacy skills. Both universities have established a local resource centre to help staff in their use of digital technology (UiT, 2017; UoW, 2016).

With the two countries' different implementation strategies in mind, examining the motivational factors that are presented as explanations for teacher educators' own use of digital technology would be interesting. In our previous study (Madsen, Thorvaldsen, & Archard, 2018), we examined different strategies to implement digital technology in teacher education based on Argyris and Schön's *theory of action*. The present study goes one step deeper and explores how motivation can be affected by educational policy and strategies.

Motivation affects the success of learning across all aspects of educational activity. Most people only commit to *action* if they feel a certain level of *motivation*. We may state that motivation comes first, followed by action. However, when we are trying to change the course of something already in motion, action comes before motivation. The process model of motivation is characterised by an increasing emphasis on viewing motivation not simply as a static product but as a dynamic process (Dörnyei, 2005; Dörnyei & Ottó, 1998; Piggin, 2012). The motivation chain is not only a two-part chain but is an endless loop: motivation → action → motivation → action → etc. Our actions create further emotional reactions and move on to motivate future actions. Therefore, motivation is of central importance for a better understanding of the present state of affairs of digital technology in teacher education.

Research question

What is the motivation of Norwegian and New Zealand teacher educators for using digital technology when teaching?

The Norwegian implementation strategy and associated gap

Norway was one of the first countries to base its curricula on digital technology when implementing the reform *Knowledge Promotion* in 2006 (Sørby, 2007). The new curricula covered the 10-year compulsory school and upper secondary education defined five skills that were presented as basic to all learning in school, work and social life. These

skills were considered basic in the sense that they are fundamental to learning in all subjects and are prerequisites for students to show their competence and qualifications (Udir, 2013a). Digital skills are one of these five defined skills. As stated earlier, Norway has been exposed to a stronger top-down educational implementation of ICT than have other countries (Krumsvik, 2014).

Motivational theory is therefore central in this study because although Norwegian schools have had a widespread ongoing policy regarding the use of digital technology, national surveys reveal a gap between the established policy and actual practice in Norwegian education at all levels. A review of the relevant literature shows that this gap is often attributed to practitioners' deficiencies (Egeberg et al., 2017; Enochsson & Rizza, 2009; Player-Koro, 2013; Thorvaldsen et al., 2011). However, studies on Norwegian teacher educators have indicated that this is more a question regarding practitioners' attitudes than competencies (Madsen, Thorvaldsen, et al., 2018). This leads me to question why they are not motivated to exercise their competencies at the same level as their New Zealand colleagues.

Elstad (2016) states that the ambitious government strategies for implementing ICT in schools have been criticised by researchers and school professionals alike. Whether the changes brought about by the Norwegian educational reforms in 2006 were motivated by political eagerness rather than a concern for quality in education has also been questioned (Krumsvik, 2014). Fifty years after Auerbach's predictions, Krumsvik (2014) states that we are still in the infancy of understanding how digital technology might contribute to the field of education, and Elstad (2016) asserts that educational technology has raised false expectations.

The New Zealand implementation strategy

The New Zealand Curriculum is a statement of official policy relating to teaching and learning in English-medium New Zealand schools. According to the Ministry of Education, it sets the direction for student learning and provides guidance, as individual schools are required to base their local school curriculum on the principles and values of *The New Zealand Curriculum*. Schools must encourage and model the values and develop the key competencies at all year levels. However, the New Zealand curriculum is to be understood as a framework rather than a detailed plan. 'This means that while every school curriculum must be clearly aligned with the intent of this document, schools have considerable flexibility when determining the details' (MoE, 2017).

The New Zealand strategy for implementing digital technology was initiated by the introduction of key policies, such as *Interactive Education: An Information and Communication Technologies Strategy for Schools* in 1998; *Digital Horizons: Learning Through ICT* in 2003; *Enabling the 21st Century learner: An e-Learning Action Plan for Schools* between 2006 and 2010; and *Foundations for Discovery* in 2005. The aim was to provide a cohesive plan to support and guide the practice of teachers in all education

sectors in New Zealand (Ham et al., 2010). New Zealand is now to a greater degree facing a shift towards a more top-down approach, as the New Zealand Education Review Office included digital literacy as an indicator when reviewing school performance (MoE, n.d.). This change in the Education Review Office's policy coincides with the New Zealand government's announcement that by 2018 digital technology would be formally introduced as a subject into the New Zealand curriculum (Parata, 2016). As reported, the technology learning area has been revised to strengthen the positioning of digital technologies in The New Zealand Curriculum for all students from years 1–13 (MoE, 2020b). The technology learning area has three strands—technological practice, technological knowledge and the nature of technology (MoE, 2020a), and all schools are expected to be teaching the new digital technologies content from 2020 (MoE, 2020b).

Both Norway and New Zealand have an existing policy that has a strong focus on digital technology. A mandatory strategy was implemented in 2006 in Norway, while it was suggestive in New Zealand until 2020. Data for this article was collected in 2016, prior to New Zealand's revision of the technology learning area.

Method

This study employs an explanatory sequential design in which a survey comprises the first phase of a sequence of methods. It is a comparative study involving 64 Norwegian participants from UiT the Arctic University of Norway and 44 New Zealand participants from the University of Waikato with a response rate of 83.8% and 73.4%, respectively. Ten participants from each university were invited to participate in in-depth qualitative interviews.

First phase: the survey

The survey was constructed to measure three aspects of digital technology in education—professional digital competence, professional attitudes towards digital technology and professional application of tools. Data was collected from teachers' self-reports on five-point Likert-type questionnaire items. Some items were collapsed into three multi-item constructs, while others remained as single items (Madsen & Thorvaldsen, 2019).

Professional digital competence also contains three aspects and was operationalised using the definitions by Tømte and Olsen (2013) and Lund et al. (2014). Professional digital competence is understood as comprising three defined aspects, pedagogic and didactic understanding, subject-specific understanding and technological understanding. This is in line with the technological pedagogical content knowledge (TPACK) framework, which has three similar components of teachers' knowledge, content, pedagogy and technology (Koehler & Mishra, 2009). The definition was chosen because the literature is generally in agreement regarding understanding of the three aspects of professional

digital competence (Lund et al., 2014; Pettersson, 2018; Koehler & Mishra, 2009). The construct professional digital competence consists of five variables.

The second aspect is staffs' professional attitude towards educational digital technology. Statements were prepared based on the OECD report 'Connected Minds: Technology and Today's Learners' (2012) and its description of the field's existing attitudes towards technology. This was done to obtain an understanding of teacher educators' professional attitudes toward digital technology. The construct professional attitude consists of five variables.

The measuring of the third aspect of professional application of tools shows to what extent the participants report using digital tools and work methods in their own teaching for the past year. This construct consists of 16 variables on digital tools/work methods applied in teaching during the past year.

Professional digital competence and professional attitude were measured using five-point Likert-scaled statements with the following scoring options: 1 = strongly disagree, 2 = moderately disagree, 3 = neutral, 4 = moderately agree and 5 = strongly agree. Professional application of tools was measured based on the reported frequency of use of 16 digital technologies and work methods of the participants in their own teaching in the past year, with 1 = never, 2 = rarely, 3 = occasionally, 4 = often and 5 = extensively. The Cronbach's alpha was computed for all constructs as a measure of internal consistency and reliability. The evaluation of the reliability of the data and the internal consistency in the three constructs created a basis for further analyses. See Madsen, Thorvaldsen and Archard (2018) for detailed statements prepared within the different constructs.

Second phase: the interview

The first step in strategically selecting interview participants was to ensure that all participants had *high digital competence.* The aim was to gather informed opinions regarding the use of technology in educational contexts. The second step was to select participants from within this group of digitally skilled teacher educators using maximum variation sampling. Maximum variation sampling is a purposeful selection of participants with different perspectives on a phenomenon (Creswell, 2013). The category *attitudes towards digital technology* was used to select five participants who responded more critically and five participants who responded more positively towards digital technology in each country.

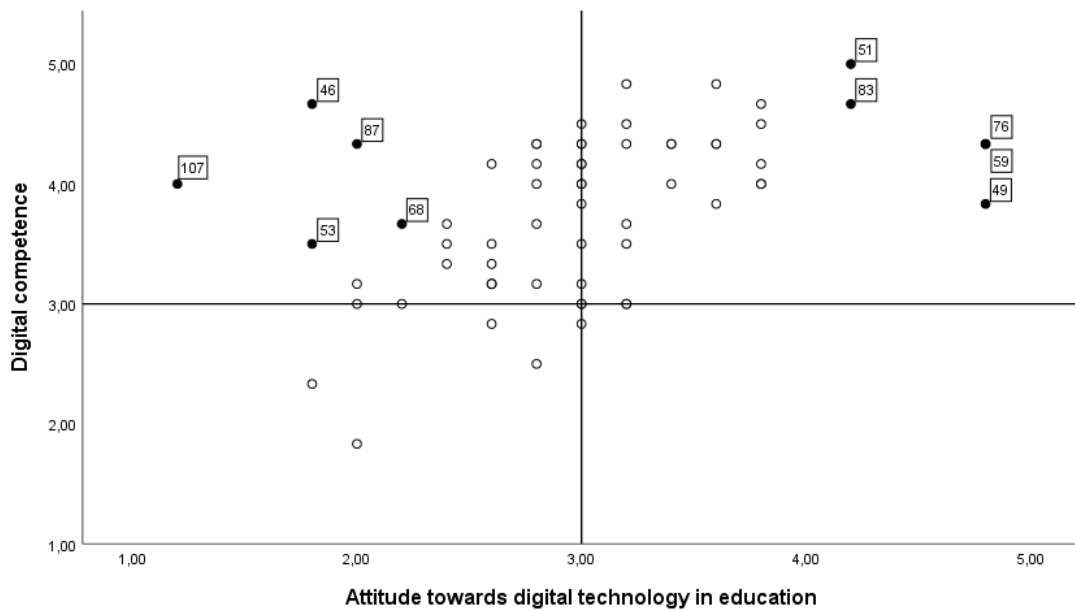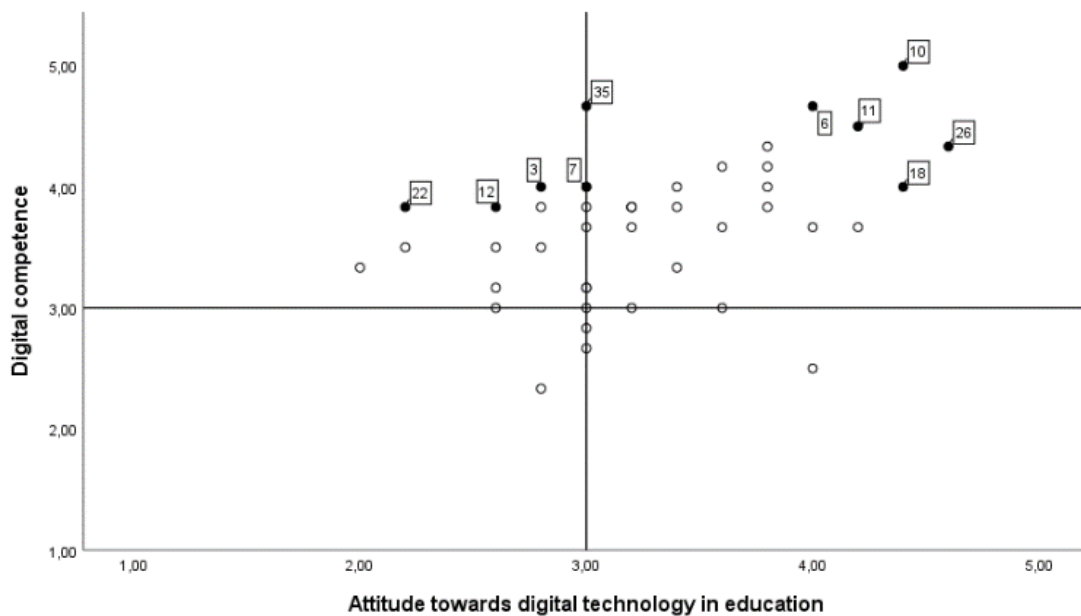*Figure 1: Selection of Norwegian teacher educators*

Figure 2: Selection of New Zealand teacher educators

A total of 20 semi-structured interviews were conducted to understand and elaborate the results of the survey. During these interviews, the respondents were asked to explain their motivation for using digital tools when teaching. The transcribed interviews were subsequently analysed using NVivo. The analysis was abductive in the sense that it was based on empirical facts (inductive approach) but did not reject the original theoretical

structures enwoven in the interview guide (Alvesson & Sköldberg, 2017). NVivo was therefore used both to organise data and to identify unforeseen themes in the material.

Quotes are used to exemplify the findings and are anonymised. Statements from more than one teacher educator have been collapsed into one statement to concentrate the meaning and secure central points, always being careful not to alter the content. When central to the discussion, the teacher educators' nationality is added.

Background for the interviews: results of the survey

The regression analyses carried out separately for each country revealed an interesting story. The best predictor of the professional application of digital tools in New Zealand was teacher educators' level of digital competence (Beta = .473, p-value = .002), whereas the best predictor in Norway was teacher educators' attitude towards digital technology in the educational context (Beta = .382, p-value = .003). It seems that the influence and contribution of digital practice occurs quite differently; in Norway, the use of digital technology is mainly affected by teacher educators' professional attitude, whereas in New Zealand it is affected by teacher educators' digital competence (Madsen, Thorvaldsen, et al., 2018).

Table 2: Regression analysis to predict the professional application of digital tools

Variable list	Norway		New Zealand	
	Beta (standardised)	p-value	Beta (standardised)	p-value
Digital competence	.175	.16	.473	.002**
Professional attitude	.382	.003**	.171	.23

** Significant at the 0.01 level (2-tailed)

At the same time, digital competence is somewhat lower in New Zealand than in Norway, but the professional application of digital tools is significantly higher in New Zealand (Madsen, Thorvaldsen et al., 2018).

Table 3: Self-perceived use of digital tools and digital competence in Norway and New Zealand

Variable List	Scale	Norway Mean (SD)	New Zealand Mean (SD)	p-value	Effect Size (d)
Professional application of tools[c]	1–5	2.59 (.54)	2.99 (.53)	<.001***	-.75
Digital competence [c]	1–5	3.91 (.76)	3.71 (.69)	.16	.28

N = 108. *** Significant at the 0.001 level (2-tailed)

Why are there significant differences between Norwegian and New Zealand teacher educators? The Norwegian mismatch between attitudes and practices in the use of digital tools merits a deeper analysis.

Motivation theory

An old and often used formula for work performance is *performance = abilities × motivation* (Anderson, 1974; Bolman & Deal, 2018; Maier, 1955). Using surveys and quantitative analyses, Madsen, Thorvaldsen, et al., (2018) evaluated Norwegian and New Zealand teacher educators' abilities (digital competence) and performance (professional application of digital tools), (see Tables 2 and 3).

Using qualitative interviews, the present study investigates whether different aspects of motivation could be the element in the formula that explains the differences found between the two groups' digital performance. The aspects of motivation used in this study are the same aspects used in Herzberg's motivation theory, assessed by coding the material accordingly. Understanding motivation as a possible key issue is central considering that research indicates Norwegian teacher educators have better abilities to teach using digital technology but are teaching less using digital technology compared to their New Zealand counterparts. What do Norwegian and New Zealand teacher educators say when asked about what motivates their use of digital technologies in their professional practice?

Herzberg's two-factor theory

Herzberg and his collaborators published *The Motivation to Work* in 1959, proposing two factors that influence motivation at work (Basset-Jones & Lloyd, 2005). Herzberg (1968) states that the psychology of motivation is tremendously complex. His findings suggest that the factors involved in producing motivation are separate and distinct from those that lead to job dissatisfaction. These two categories of factors are not considered opposite to each other. The opposite of job satisfaction is *no* job satisfaction, and the opposite of job

dissatisfaction is *no* job dissatisfaction (Herzberg, 1968). Two different needs are involved—one stems from the built-in drive to avoid pain, and the other relates to the ability to achieve and experience psychological growth. The stimulus for growth is the *job content*, and the stimulus inducing pain avoidance behaviour is the *job environment* (Herzberg, 1968). Based on this, Herzberg came up with the factors affecting job attitude (see Table 4), which are motivation factors (growth) and hygiene factors (dissatisfaction avoidance).

Table 4: Factors affecting job attitude

Motivation Factors	Hygiene Factors
• Achievement • Recognition • The work itself • Responsibility • Advancement • Growth	• Company policy and administration • Supervision • Relationship with the supervisor • Work conditions • Salary • Relationship with peers • Personal life • Relationship with subordinates • Status • Security

Herzberg (1968) states that motivators are the primary cause of satisfaction, whereas hygiene factors are the primary cause of dissatisfaction. Hygiene improvements typically have a short-term effect, whereas motivator improvements have long-term effects (Herzberg, 1976).

Achievements

Alshmemri et al. (2017) state that positive achievement includes achieving specific success. Examples are completing a difficult task on time, solving a job-related problem or seeing the positive results of one's work. However, negative achievement involves failure to make progress at work or poor decision making on the job. One teacher educator explains how digital technology serves to solve job-related challenges with positive results for one's work. Teacher educators describe how they are achieving a better teaching context both for themselves and for the students:

> My motivation is that the tools serve and help me when I'm teaching, and the students are learning. The tools should increase learning and assist learning. They're supposed to ease the process, right?

These teacher educators expressed their motivation to use digital technology by achieving better quality in their teaching in terms of the teachers' own performance and the students' learning outcomes, that is, more effective learning. Other teacher educators focus on achieving better learning for the students as their main motivation for teaching with digital technology. They state that through digital technology they achieve a better educational context regarding the students' needs and learning outcomes. This is explained by

maximising learning for students, thus securing major advantages for them. These advantages are explained by having the ability to be connected when working from home, both in terms of doing homework and having the ability to communicate with their lecturer without going to class. It is described as a more flexible, rich way of learning.

When students with smartphones and laptops are doing other things than learning, one teacher explains that utilising the tools for education makes them achieve something better together. One teacher educator said that teaching students to use digital tools in educational contexts will help them to help students (in schools) learn in a better way in their future occupations. Achieving digital learning outcomes through the educators' teaching secures the students ability to meet schools' and children's need for future skills, which is stated to be a central motivation.

The statements used to exemplify Herzberg's theory often touch on several of the categories, such as statements where the teacher educator is focusing both on better learning for the students and acknowledging the need to prepare for the future as an important motivation. This form of achievement as motivation seems to overlap the motivation tied to a feeling of responsibility for several of the teacher educators.

Table 5: Comparisons between the two factors in Herzberg's theory

	Motivation Factors	Hygiene Factors
Absent	The outcome is no satisfaction.	The outcome is dissatisfaction.
Present	The outcome is satisfaction.	The outcome is no dissatisfaction.
Herzberg's description	Intrinsic to the job	Extrinsic to the job
Important to job satisfaction	Strong	Poor

See Alshmemri et al. (2017).

Based on the two-factor theory, why are teacher educators using digital technology when teaching?

The participants were asked what their motivations were for using digital tools in their teaching. The answers were categorised based on Herzberg's two-factor theory. They did not appear to have a clear pattern consistent with the strategic attitude-based selection of the participants. This could indicate that the maximum variation sampling strategy produced two groups with different attitudes but without any diametrical contradictions. It looks like the described gap between what the OECD describes as digital evangelists (very optimistic) and digital catastrophists (very critical) has evolved into a more nuanced and unified view of digital technology (OECD, 2012). A pattern between the Norwegian and New Zealand teacher educators was more prominent. The motivation factors recognition, the work itself and advancement are not shown in Table 6, as they were not mentioned as explanations of teacher educators' motivation for using digital tools. The same applies to the hygiene factors supervision, salary, personal life, relationship with subordinates, status and security. The responses related to what motivated the teacher educators

were categorised as achievement, responsibilities and growth, and the responses catego-
rised as hygiene factors were related to company policy and administration, work condi-
tions and relationship with peers (see Table 6). As far as a university can be understood
as a company (see the Limitations section), company policy in this context is the educa-
tional policy and framework related to teacher educators' education of pre-service teach-
ers.

Herzberg explains how hygiene factors do not create motivation. These factors deter-
mine whether an employee experiences job dissatisfaction or *no* job dissatisfaction. Nev-
ertheless, when asked about what motivates them, many of the respondents explained
how hygiene factors affected their situation regarding digital tools and teaching. Many
claimed that formalised curricula for schools and teacher education was their main moti-
vation for using digital technology when teaching. This could indicate that the everyday
use of the word 'motivation' involves a broader definition than that used in the Herzberg
model. The everyday use of the term seemed to include both motivation and hygiene
factors.

*Table 6: Overview of the response distribution based on the categories in Herzberg's
two-factor theory*

Country	Motivation Factors			Hygiene Factors	
	Achievement	Responsibility	Growth	Company Policy	Work Conditions
No	x		x		
No				x	
No		x	x		
No				x	
No	x	x		x	
No				x	
No	x	x			
No				x	x
No	x			x	
No				x	x
NZ		x			
NZ		x			x
NZ	x	x	x		
NZ	x		x	x	
NZ	x				
NZ	x	x			
NZ					x
NZ	x		x		
NZ	x	x			
NZ					x
Total:	10	8	5	8	5

Motivation factors

Motivators such as recognition, work itself, advancement, responsibility and achievement generate job satisfaction, whereas their absence leads to no job satisfaction but has nothing to do with job dissatisfaction (Malik & Naeem, 2013). Thirteen of the respondents mentioned one or more motivation factors when asked about what motivates them to teach using digital technology. These are the factors affecting the experience of job satisfaction or no job satisfaction. Ten of the respondents replied that they experienced achievement in different ways when using digital technology, whereas five spoke about personal growth. Eight also expressed a notion of being responsible for their students, both in terms of the policy and framework for future exams and the general future of these students as citizens in a digital world.

Responsibility

According to Alshmemri et al. (2017), this factor includes both responsibility and authority in relation to the job. Responsibility is related to gaining satisfaction from being given a responsibility and the freedom to make decisions. Many of the teacher educators explained that their motivation to use digital tools was related to the feeling of having a responsibility as a teacher educator to prepare the students for their future jobs.

> I would say … because my only teaching now is online, I don't really have a lot of choice. I feel responsible for my students, getting them ready for the 21st-century classroom, especially because a lot of them are teachers … aspiring teachers. So there's a duty that I have to encourage them to get started.

In the same way as achievement and responsibility are overlapping categories, responsibility and curricula as an educational policy are also closely linked. One Norwegian teacher educator explains that teachers in schools are not prepared for the responsibility tied to teaching in line with the curricula and its description of how the use of digital tools is a basic skill for all learning. Some are worried, as the policy has been implemented top-down, and at the end of the day it would negatively affect students in schools when they are tested in the 10th grade and do not know how to use technology. According to one teacher educator, this is because the teachers themselves do not know how to use it. This is described as a responsibility that motivates, as teachers will not be able to cope with the demands because the Ministry, according to one teacher educator, is assuming teachers are able to teach using digital tools. This is explained when asked about what motivates the use of digital technology; the answer is the responsibility to educate teachers to meet the need for professional digital competence in schools.

There is a close link between the teacher educators' experience of responsibility and their understanding of policy and the political governance of education. Bentzen (2015) states that there is a risk of developing a professional tunnel vision whereby employees are forced to do what is being measured and not what is professionally reasonable. One

concern is that increased control through policy and frameworks could demotivate dedicated employees because the top-down governance could be perceived as a lack of trust in their professionalism (Bentzen, 2015; Moynihan, 2010). This could affect teacher educators' motivation to teach using digital technology. The form of responsibility that the teacher educators mentioned is not the responsibility given by their superiors at the workplace but one that is related to the students and emerges because of defined frameworks and future need for digital competence.

This form of responsibility seems to function as a motivation factor but tends to be described as extrinsic by teacher educators in both Norway and New Zealand. It is not so much based on pedagogical reasoning or making the students better teachers. Several of the teacher educators explained this sense of responsibility from an external point of view, not as a motivation factor as Herzberg explained it but more as a duty based on a context they had to cater to. This understanding of responsibility seems to be a consequence of the formal framework and political pressure to participate in digital development in education instead of being an intrinsic factor that motivates the use of digital technology. Alshmemri et al. (2017) state that the gap between responsibility and authority negatively affects job satisfaction, potentially leading to dissatisfaction.

Growth

Alshmemri et al. (2017) state that possibilities for growth are actually opportunities for people to experience personal growth and be promoted in the workplace. This allows professional growth, increased opportunities to learn new skills, acquiring training in new techniques and gaining new professional knowledge. The experience of professional growth is mentioned by several of the teacher educators. They find that digital technology has developed their pedagogical competence:

> It has become a necessity … I think. Some might say, "It's the way we're all going", and I think that's actually true. […] I could resist that notion, and I think at times that it has been a little about resistance because of fear and perhaps a little traditionalism … but generally, for me, I reflected fairly significantly on my pedagogy of digital teaching or teaching with digital technology, and I embraced it. So, my competence level has been challenged, but my pedagogical level has been improved, I think.

Other teacher educators explain how digital tools in themselves help in structuring lectures and refining old lectures. Digital tools facilitate the possibility to deepen understanding of a subject. One teacher educator explains how looking at lectures from the past gives insight into their own professional development, as it makes it easy to go back and create insight in the learning process connected to teaching a subject over time. 'It sort of works like a documentation of your own development as a professional.' Being able to achieve a meta perspective on one's own teaching and professional development is explained as a motivational factor for teaching with digital tools and is important for teacher educators' self-evaluation.

Hygiene factors

Seven of the teacher educators did not explain their motivation for using digital technology with any of Herzberg's motivation factors. Instead, they tended to respond with explanations related to Herzberg's hygiene factors, particularly those related to company policy and work conditions when teaching online, students in other areas of the country and being assigned online courses.

Company policy as a hygiene factor

Company policy includes descriptions of adequate or inadequate company organisation and management policies and guidelines. This factor involves good or poor organisational policies that affect employees (Alshmemri et al., 2017). Eight of the teacher educators mentioned curricula as a motivation for using digital tools; seven of these were Norwegian teacher educators. Even though the curricula was mentioned as a motivation to use digital technology, many of the Norwegian teacher educators described curricula as being imposed, mandatory and not in line with their own convictions as educators, while the New Zealand teacher educators who mentioned curricula were not critical. One Norwegian teacher educator explains:

> My motivation is the curricula, I find. I'm not sure I would've applied digital tools if they weren't in the curricula. Maybe, but … Well, I use them when I find them functional, which is very often. I also use them because there's a high expectation to use digital technology. In reality, I'm very fond of policy. It guides my practice but not necessarily as a straitjacket. Policy can annoy me, but I still teach in line with it. For example, using digital tools has become a part of the curricula, and it straight-out annoys me. But still, I teach according to the policy.

So even if curricula as educational policy is explained as a motivation, it comes across as an imposed duty governing practice. Another thing mentioned by several teacher educators is the lack of support related to educational policy and digital technology:

> It's in a way imposed on you without a discussion on why it's important. Exams are supposed to be based on digital tools, but they are imposed top-down, again and again. We have not had any discussion regarding this, no. *Why* we are using digital tools is not the agenda. When politicians are doing this … sometimes, it seems like they've never been to a school and observed that … well ... Much is imposed without sufficiently clarifying the *what*, *why* and *how to implement it*.

Norwegian teacher educators state that they feel required to teach in line with the curricula and educational policy at the university even if it is not in line with their educational convictions. One explains that he thought it would improve teaching, but the motivation crumbled as he struggled to see the educational value. Critical literature is in line with the teacher educators' experiences, and a feeling of being tricked emerged:

> I have read critical literature and followed the debate in the media. This has made me think that many of my own reflections have already been debated on by others and even researched about,

especially concerning the use of tablets in schools and reading on tablets. I've experienced myself that it's almost impossible, really. I have to print text. I didn't think I would have to, but I do so in order to get the content into my head. …And the effect of using a pencil when you're writing. Research into the brain and connections to learning has perhaps made me a bit more critical, and in a way, I say, "Oh my God, I've been tricked. The Emperor's new clothes? Have they used all that money?" The Minister of Education is talking about things he's ignorant about. How is it possible? It's just a tool. Does one use a tool for the sake of using it? I've been terribly disappointed with … well … What was the real reason to implement this in schools? Is it money? I've become very critical.

In Herzberg's theory, company policy is a hygiene factor, and Herzberg states that a hygiene factor cannot motivate. A *hygienic* environment prevents discontent with the job, but such an environment cannot lead the individual beyond a minimal adjustment consisting of the absence of dissatisfaction. The fact that policy is mentioned as a motivation for using digital tools is therefore interesting, as policy is not described as being in line with the teacher educators' beliefs and understandings. It seems like policy is a strong governance tool in teacher educators' practice, but what they express appears to reveal dissatisfaction.

> '(…) it is the actual job content that will produce the motivation, not attitudes about being involved or the challenge inherent in setting up a job. That will be over shortly, and it is what the employees will be doing from then on that will determine their motivation' (Herzberg, 1968, p. 62).

Work conditions as a hygiene factor

These factors involve the physical characteristics of the job. Work conditions may include the amount of work, the space for it, ventilation, tools, temperature and safety. A good environment makes employees satisfied (Alshmemri et al., 2017). Many of the teacher educators mentioned the practical issues related to work conditions when teaching online courses. Some mentioned these online courses as flexible ways of teaching and a new way of learning in contrast to the more traditional ways of teaching:

> So … flexibility means they don't have to read every single word and memorise it, but they have to understand it, really, over time. So, they can come and go within the class, and it'll still work for them. So that's the compromise, that's as far as I'm going to go with my compromise … using digital tools to teach is one way you can actually accommodate the fact that students don't turn up to every lecture these days. Very few people would turn up for each lecture nowadays.

Online-based teaching allows increased flexibility, for example, to follow up and meet students in other arenas than one would without the use of digital tools. These possibilities make it easier for the lecturer to establish contact with students not attending classes. Some lecturers say that they even get a closer connection to students when talking online, as it is easier to follow up individual students. According to another teacher educator, the virtual classroom creates pedagogical opportunities that are more difficult to achieve in

traditional classrooms. Students are described as much more willing to engage in conversations when they can do so in a virtual way. Online classes allow students who would often be quiet in a face-to-face class to have a space where they can come together and talk online and have their voices heard as a part of a conversation. However, several mentioned that technical issues were frustrating when teaching online courses and that technology is not ready for this kind of virtual classroom.

Performance = Abilities × Motivation

The old formula for work performance (performance = abilities × motivation) was applied to understand the results in relation to one another. The effect size between Norwegian and New Zealand teacher educators' application of digital tools is 0.75. This means that there is a moderate to large difference between the two countries' application of such tools. New Zealand teacher educators used digital tools more frequently than did Norwegian teachers. On the basis of this formula, teacher educators' performance is a result of their abilities and motivation. Performance is higher in New Zealand; however, the difference in professional digital competency between the two countries is small and is not statistically significant. This leaves motivation as an explanation for the difference in performance.

Using this formula is far from sufficient to understand the complexity of educational policy and practises, but it supports a notion of there being a link between motivation and performance. The results could indicate that motivation is a key element in understanding why the use of digital tools is more frequent amongst New Zealand teacher educators. This notion is further strengthened when looking at the distribution of responses in relation to motivation factors and hygiene factors within each country (Table 7).

Table 7: Distribution of motivation factors and hygiene factors in responses to what motivates teachers' use of digital technology

	Motivation Factors	Hygiene Factors
Norway	9	9
New Zealand	14	4

When clarifying their motivation for using digital technology, the Norwegian teacher educators explained it with 9 motivation factors and 9 hygiene factors. The hygiene factors were those relating to the mandatory curricula and the work conditions when teaching online. The New Zealand teacher educators explained their motivation with 14 motivation factors and only 4 hygiene factors. The New Zealand teacher educators seemed to be more motivated to work with digital technology than the Norwegian teacher educators. This lack of motivation may be one reason that could explain why the application of digital tools seems lower in Norway than in New Zealand. The hygiene factors mentioned are also described in a way indicating that both policy and work conditions are sources of frustration and dissatisfaction.

Limitations

Critique of the two-factor theory

Herzberg's two-factor theory has been criticised over the years in somewhat heated debates. Several scholars have raised questions regarding a scaling bias in the method of experimentation that restricts respondents' opportunities to register negative reactions to motivation factors and positive reactions to hygiene factors (Gordon et al., 1974; Schneider & Locke, 1971). Others claim that the reality is more complex. There is also an issue regarding polarity in the model that was based on the data of one company with only male employees (Lindsay et al., 1976). These things must be considered when analysing and interpreting the results.

The university as a company?

Herzberg's theory is based on a company. So an important question is whether the model fits a university as an organisation, as some argue that a university should not be a company. According to Bräunig (2011), the main output of universities is lecture and research services. The established approaches to measure the output are more or less technically oriented. For example, lecture services can be quantified according to the number of courses or students, and research services can refer to the acquired projects or number of pages published in journals, books or electronic media. Universities are not per definition a company, but there are similarities. For example, starting a Bachelor of Teaching in New Zealand will cost a student $7,709 and an international student $29 780 (NZD). This is only for the first year (UoW, 2020a; UoW, 2020b). In Norway, higher education is more or less free for students because it is government funded. The university receives funds per student completing (Utdaningsforbundet, 2014). The debate regarding the university as a company is old but still ongoing in both the academic literature and other media (Chambers, 1931; Soh, 2005; Posner, 2002; Kasperkevic, 2014; Callahan, 2014). However, in times of new public management universities seem to be run like businesses. This is described as an unfortunate development, as the economic restructuring or even commercialisation of academic services will lead to the lower performance of academic institutions (Bräunig, 2011). Based on this, I have used Herzberg's model to analyse the data, and the model seemed to be a fit for the organisations used in the present study and served as a framework for structuring the data.

Conclusion

Recognition, the work itself, advancement, responsibility and achievement generate job satisfaction and higher productivity, whereas their absence leads to no job satisfaction rather than job dissatisfaction. The lack of hygiene factors, such as work conditions, pay, interpersonal relations, job security, company policies and administration, produces job

dissatisfaction, whereas their presence generates no job dissatisfaction rather than job satisfaction (Malik & Naeem, 2013). The motivational factors for using digital tools when teaching were achievement, a feeling of responsibility and professional growth.

A fundamental challenge regarding the implementation of digital technology in Norway seems to be the fact that policy, being a part of the job environment, creates job dissatisfaction. Teacher educators from both countries highlight achievement and policy as the main reasons for using digital technology, but Norwegian teacher educators are especially critical of education policy in their own country. Coming up with a simple conclusion regarding how to understand these findings is difficult; asserting that this resistance could be related to the different values found in the two curricula for education and learning and how they are implemented is reasonable. Norway is governed top-down, whereas New Zealand has a policy that is more suggestive of the use of digital technology.

Somekh (2007) states that a common assumption across the globe is that initial teacher education should reflect developments in their field of practice. Consequently, digital literacy should be clearly highlighted in the initial teacher education curriculum, as we are becoming a world of digitally rich environments, which includes classroom practice. Schools' curricula is not just the content of what is taught in teacher education but a strong guiding factor for education policy and curricula in teacher education. Constructing high-quality teacher education is multifaceted, requiring consideration of the current curricula in order to prepare students for future teaching positions (Engen et al., 2015).

If the stimulus for growth is the *job content* (Herzberg, 1968), then why do all the new possibilities embedded in educational technology not enable job satisfaction to a greater degree? Why are teacher educators not motivated by these new educational opportunities? A critical position is supported by recent research. Elstad (2016) states that the results of the Programme for International Student Assessment published in 2015 show no appreciable improvements in pupils' attainments in reading literacy, mathematics literacy or science literacy in countries that have invested heavily in ICT for education. Furthermore, research shows that the use of digital technology in teaching can limit attainment (Beland & Murphy, 2016; Carter et al., 2016; OECD, 2010). Nevertheless, as Elstad (2016) states, hardly anyone wishes for a situation in which learners do not use technology. Education is supposed to prepare students for the future, and it is evident that technology is going to be an important part of this. However, the societal context and the political conditions under which technology is implemented seem to affect teacher educators and their understanding of their own professional role and performance. Further research needs to investigate how teacher educators could be more motivated to work with digital technology and to take a deeper look at how policy regarding digital technology is affecting the field of education.

References

Alshmemri, M., Shahwan-Akl, L., & Maude, P. (2017). Herzberg's two-factor theory. *Life Science Journal, 14*(5), 12–16. doi:10.7537/marslsj140517.03

Alvesson, M., & Sköldberg, K. (2017). Tolkning och reflektion. Vetenskapsfilosofi och kvalitativ metod. Studentlitteratur AB.

Anderson, N. H., & Butzin, C. A. (1974). Performance = motivation × ability: An integration-theoretical analysis. *Journal of Personality and Social Psychology, 30*(5), 598–604. https://doi.org/10.1037/h0037447

Auerbach, I. (1967). Informasjon - en viktig rikdomskilde. In R. Marstrander & H. Dahl (Eds.), *Datarevolusjonen* (pp. 10–13). Dreyers Forlag.

Basset-Jones, N., & Lloyd, G. C. (2005). Does Herzberg's motivation theory have staying power? *The Journal of Management Development, 24*(10), 929–943.

Beland, L.-P., & Murphy, R. (2016). III Communication: Technology, distraction & student performance. *Labour Economics, 41,* 61–76.

Bentzen, T. Ø. (2015). *Tillidsbaseret styring og ledelse i offentlige organisationer - I springet fra ambition til praksis*. Roskilde Universitet.

Bolman, L. G., & Deal, T. E. (2018). *Nytt perspektiv på organisasjon og ledelse. Struktur, HR, politikk og symboler* (6th ed.). Gyldendal Akademisk.

Bräunig D. (2011) Why universities are not businesses. In P. Rondo-Brovetto & I. Saliterer (Eds.), *The University as a Business?* VS Verlag für Sozialwissenschaften.

Callahan, D. (2014). *What's the difference between universities and corporations? It's getting hard to say.* https://www.demos.org/blog/whats-difference-between-universities-and-corporations-its-getting-hard-say

Carter, S. P., Greenberg, K., & Walker, M. (2016). *The impact of computer usage on academic performance: Evidence from a randomized trial at the United States Military Academy* (Working Paper #2016.02). SEII School Effectiveness & Inequality Initiative. http://seii.mit.edu/wp-content/uploads/2016/05/SEII-Discussion-Paper-2016.02-Payne-Carter-Greenberg-and-Walker-2.pdf

Chambers, M. (1931). The university as a corporation. *The Journal of Higher Education*, 2(1), 24–29.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). Sage.

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Lawrence Erlbaum.

Dörnyei, Z., & Ottó, I. (1998). *Motivation in action: A process model of L2 motivation* (Working Papers in Applied Linguistics). Thames Valley University.

Egeberg, G., Hultin, H., & Berge, O. (2017). Monitor skole 2016. Skolens digitale tilstand. https://www.udir.no/globalassets/filer/tall-og-forskning/rapporter/2016/monitor_2016_bm_-_2._utgave.pdf

Elstad, E. (2016). Introduction. In E. Elstad (Ed.), *Digital expectations and experiences in education* (pp. vii-x). Sense Publishers.

Engen, B. K., Giæver, T. H., & Mifsud, L. (2015). Guidelines and regulations for teaching digital competence in schools and teacher education: A weak link? *Nordic Journal of Digital Literacy*, *10*(2), 69–83.

Enochsson, A.-B., & Rizza, C. (2009). *ICT in initial teacher training: Research review* (OECD Education Working Paper No. 38). OECD Publishing.

Gordon, M. E., Norman, M. P., & Harris, B. V. (1974). An examination of scaling bias in Herzberg's theory of job satisfaction. *Organizational Behavior and Human Performance, 11*(1), 106–121. https://doi.org/10.1016/0030-5073(74)90008-7

Ham, V., Wenmoth, D., & Core Education. (2010). *eLearnings: Implementing a national strategy for ICT in Education, 1998–2010*. CORE Education.

Herzberg, F. (1968). One more time: How do you motivate employees? *Harvard Business Review*, *81*(1), 87–96.

Herzberg, F. (1976). *The managerial choice. To be efficient and to be human*. Dow Jones-Irwin.

Kasperkevic, J. (2014, October 7). The harsh truth: US colleges are businesses, and student loans pay the bills. *The Guardian*. https://www.theguardian.com/money/us-money-blog/2014/oct/07/colleges-ceos-cooper-union-ivory-tower-tuition-student-loan-debt

Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education, 9*(1), 60–70.

Krumsvik, R. J. (2014). Teacher educators' digital competence. *Scandinavian Journal of Educational Research, 58*(3), 269–280. https://doi.org/10.1080/00313831.2012.726273

Lindsay, C. A., Marks, E., & Gorlow, L. (1976). The Herzberg theory: A critique and reformulation. *Journal of Applied Psychology, 51*(4), 330–339.

Lund, A., & Hauge, T. E. (2011). Designs for teaching and learning in technology-rich learning environments. *Nordic Journal of Digital Literacy, 6*(4), 258–272.

Lund, A., Furberg, A., Bakken, J., & Engelien, K. L. (2014). What does professional digital competence mean in teacher education? *Nordic Journal of Digital Literacy, 9*(4), 281–299.

Madsen, S. S. (2020). Understandings and attitudes regarding skill-based and competency-based cultures for learning: A comparative study of Norwegian and New Zealand teacher educators. *Educational Research for Policy and Practice*. https://doi.org/10.1007/s10671-020-09260-y

Madsen, S. S., Archard, S., & Thorvaldsen, S. (2018). How different national strategies of implementing digital technology can affect teacher educators. A comparative study of teacher education in Norway and New Zealand. *Nordic Journal of Digital Literacy, 13*(4), 7–23. https://doi.org/10.18261/issn.1891-943x-2018-04-02

Madsen, S. S., Thorvaldsen, S., & Archard, S. (2018). Teacher educators' perceptions of working with digital technologies. *Nordic Journal of Digital Literacy, 13*(3), 177–196. https://doi.org/10.18261/issn.1891-943x-2018-03-04

Madsen S. S., & Thorvaldsen, S. (2019) Conceptualising a Dynamic Technology Practice in Education Usiing Argyris and Schön's Theory of Action. In L. Rønningsbakk, T. T. Wu, F. Sandnes, & Y. M. Huang (Eds), *Innovative Technologies and Learning. ICITL 2019*. Lecture Notes in Computer Science, vol 11937. Springer. https://doi.org/10.1007/978-3-030-35343-8_31

Maier, N. R. F. (1955). *Psychology in industry* (2nd ed.). Houghton Muffin.

Malik, M. E., & Naeem, B. (2013). Towards understanding controversy on Herzberg theory of motivation. *World Applied Sciences Journal, 24*(8), 1031–1036.

McKenna, S. 2018. Here are five signs that universities are turning into corporations. https://theconversation.com/here-are-five-signs-that-universities-are-turning-into-corporations-93100

MoE. (n.d.). Towards digital fluency. http://www.education.govt.nz/assets/Uploads/Towards-Digital-Fluency.pdf

MoE (2017). *The New Zealand curriculum for English-medium teaching and learning in years 1–13*. New Zealand Ministry of Education.

MoE (2020a). *Digital technologies and the national curriculum.* http://elearning.tki.org.nz/Teaching/Curriculum-learning-areas/Digital-Technologies-in-the-curriculum#js-tabcontainer-1-tab-5

MoE (2020b). *Digital technologies in the national curriculum.* http://elearning.tki.org.nz/Teaching/Curriculum-learning-areas/Digital-Technologies-in-the-curriculum#js-tabcontainer-1-tab-1

MoE (2020c). *Practical information about education for parents and carers.* https://parents.education.govt.nz/early-learning/

MoE (2020d). *Types of schools and year levels.* https://www.education.govt.nz/new-zealands-network-of-schools/about/types-of-schools-and-year-levels/

Moynihan, D. P. (2010). A workforce of cynics? The effects of contemporary reforms on public service motivation. *International Public Management Journal, 13*(1), 24–34.

NZGI (2020). *The school system.* https://www.newzealandnow.govt.nz/living-in-nz/education/school-system

OECD (2010). *Are students ready for a technology-rich world? What PISA studies tell us*. http://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/35995145.pdf

OECD (2012). *Connected minds. Technology and today's learners.* https://www.oecd-ilibrary.org/docserver/9789264111011-en.pdf?expires=1542711724&id=id&accname=ocid195681&checksum=F77DF9188CE53

OECD (2015). *PISA 2015 Results. Excellence and equity in education. Volume 1.* OECD Publishing.

Parata, H. (2016). *NZ Curriculum to include digital technology*. https://www.beehive.govt.nz/release/nz-curriculum-include-digital-technology

Pettersson, F. (2018). On the issues of digital competence in educational contexts – A review of literature. *Education and Information Technologies, 23*(3), 1005–1021.

Piggin, G. (2012). The pedagogic application of a process-oriented model of L2 motivation. *Polyglossia, 22*, 59–66.

Player-Koro, C. (2013). Hype, hope and ICT in teacher education: A Bernsteinian perspective. *Learning, Media and Technology, 38*(1), 26–40.

Posner, R. A. (2002, June). The university as business: Universities have come to regard their students as customers. *The Atlantic*. https://www.theatlantic.com/magazine/archive/2002/06/the-university-as-business/376623/

Schneider, J., & Locke, E. A. (1971). A critique of Herzberg's incident classification system and a suggested revision. *Organizational Behaviour and Human Performance, 6*, 441–457.

Soh, L. C. H. (2005). *How different are universities from companies? Financial reporting perspectives and the market for vice chancellors (Part 5).* Economics Discussion/Working Papers 05-13, The University of Western Australia, Department of Economics.

Somekh, B. (2007). *Pedagogy and learning with ICT: Researching the art of innovation*. Routledge.

Sørby, M. (2007). Digitalt kunnskapsløft. *Nordic Journal of Digital Literacy, 2*, 57–60.

Thorvaldsen, S., Egeberg, G., Pettersen, G. O., & Vavik, L. (2011). Digital dysfunctions in primary school: A pilot study. *Computers & Education, 56*(1), 312–319.

Tømte, C., and Olsen, D. S. (2013). IKT og læring i høyere utdanning. NIFU Rapport 32/2013. http://os-loedtech.no/wp-content/uploads/2016/03/NIFUrapport2013-32.pdf.

Udir (2013a). *Framework for basic skills.* https://www.udir.no/in-english/Framework-for-Basic-Skills/

Udir (2013b). *Privat hjemmeundervisning Udir-5-2013.* https://www.udir.no/regelverkstolkninger/opplaring/Skoleeiers-ansvar/Udir-05-2013/

UiT. (2017). Result: Om oss. http://result.uit.no/om-oss-og-kontaktinformasjon/

UoW. (2016). About the Waikato Centre for eLearning. http://online.waikato.ac.nz/ wcel/

UoW (2020a). *Domestic tuition costs 2020.* https://www.waikato.ac.nz/study/costs/tuition-costs-domestic

UoW (2020b). *International tuition costs 2020.* https://www.waikato.ac.nz/study/costs/tuition-costs-international

Utdanningsforbundet (2014). *Finansieringssystemet i høyere utdanning – hvordan påvirker det kvaliteten i sektoren? Temanotat 4/2014.* https://www.regjeringen.no/contentassets/54055a655c7a43fc8083eb48cf42680e/innspill_utdanningsforbundet.pdf