The role of academic management in implementing technology-enhanced learning in Higher Education

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Management: To what degree do you agree with the following statements on implementation of digital tools/media in your department?

	Agree strongly	Agree	Neutral	Not
Mid-management actively support academic use of digital tools/media	42	44	15	0
Academic staff is involved in choices of digital tools/media	53	32	15	0
Academic staff is involved in mapping needs	39	51	10	0
Use of digital tools is initiated by academic staff	13	52	25	10
My role as manager is important	29	58	13	0

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

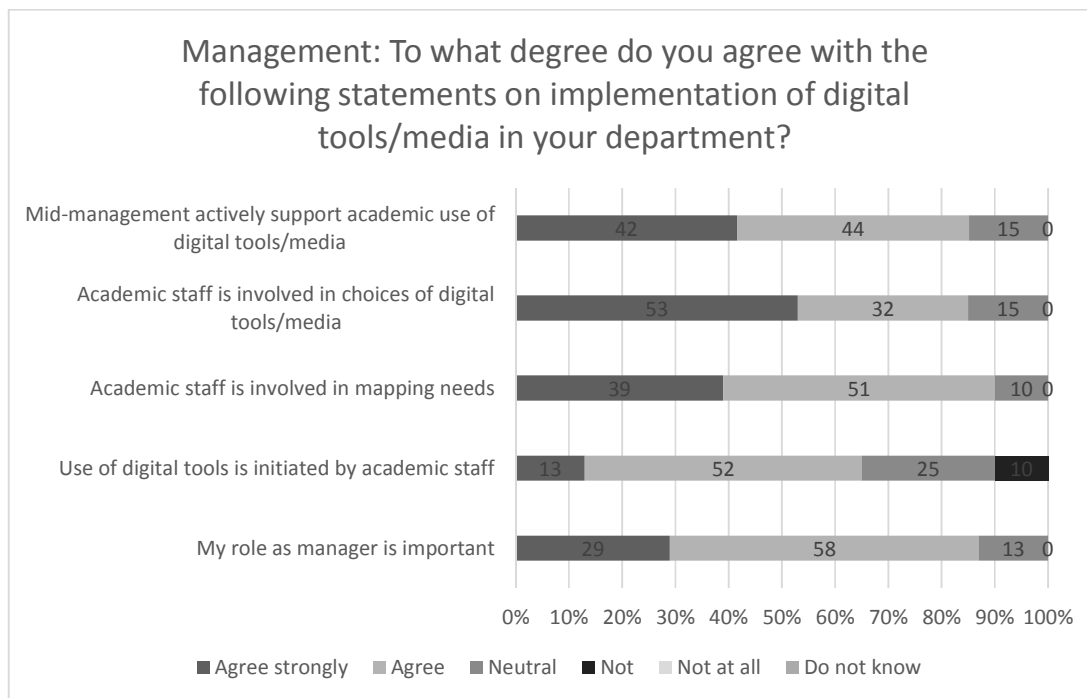■ Agree strongly　■ Agree　■ Neutral　■ Not　■ Not at all　■ Do not know

Figure 1. Academic management's opinions on the implementation of digital media
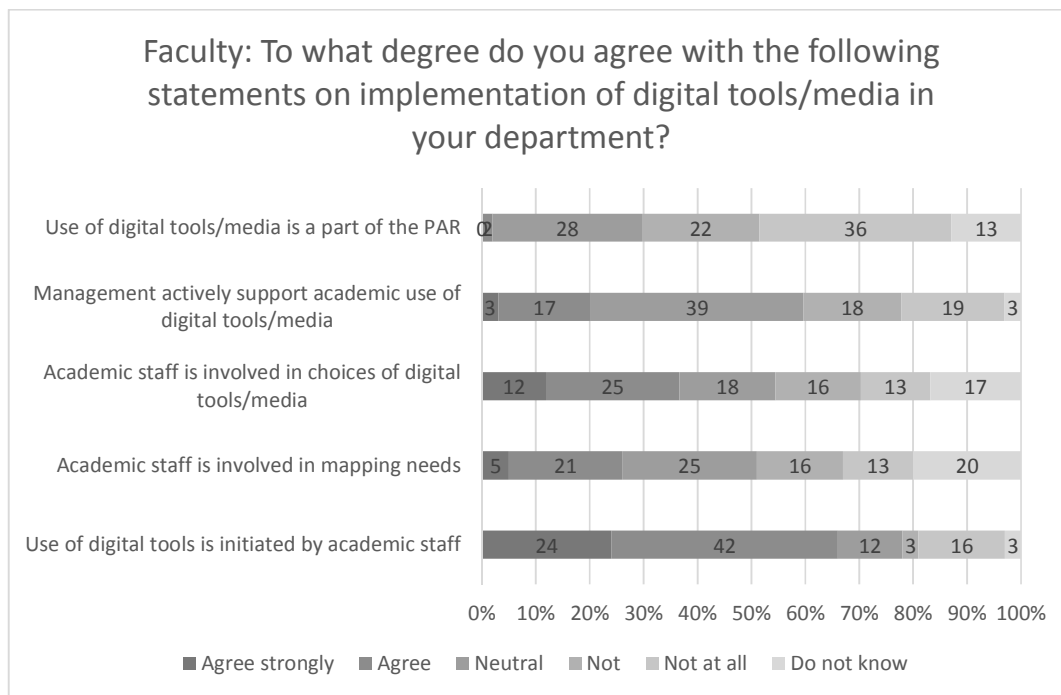
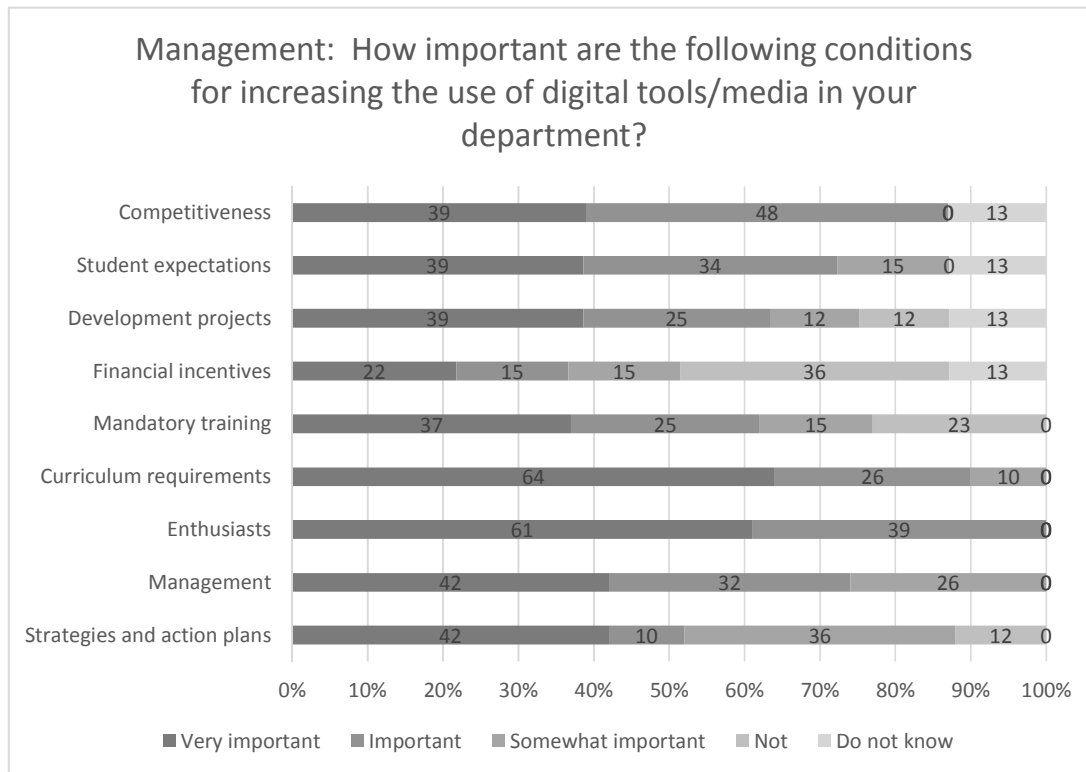Figure 2. Faculty's opinions on the implementation of digital media

Figure 3. Academic management's opinions on conditions for increasing digital media use
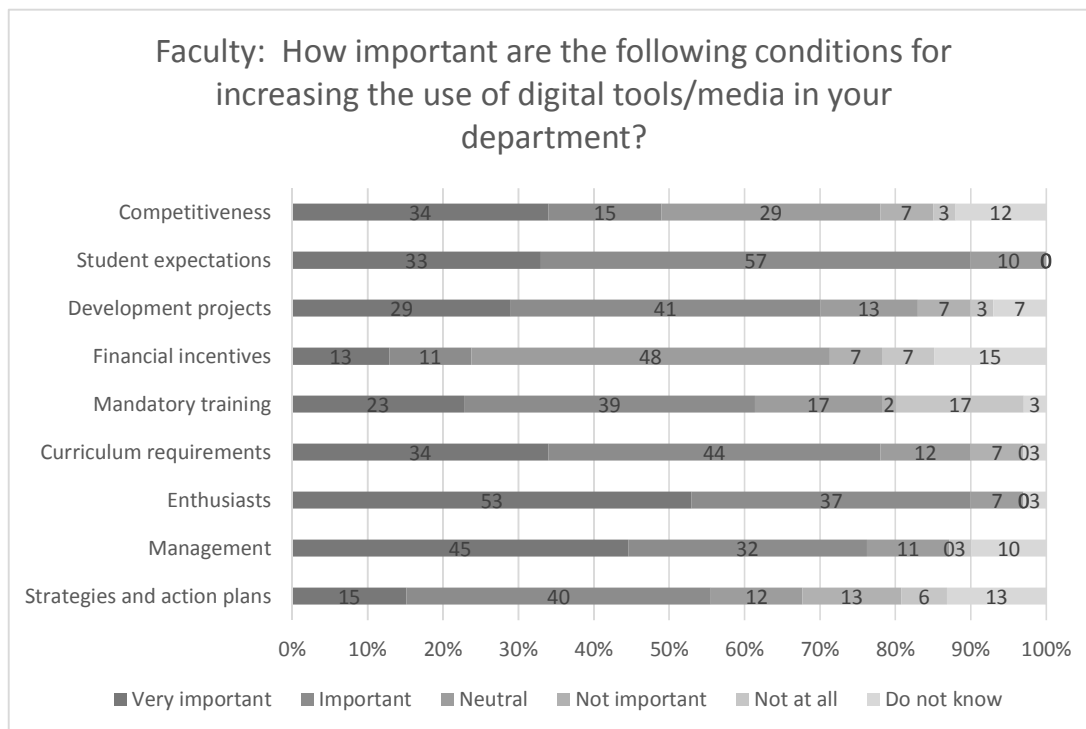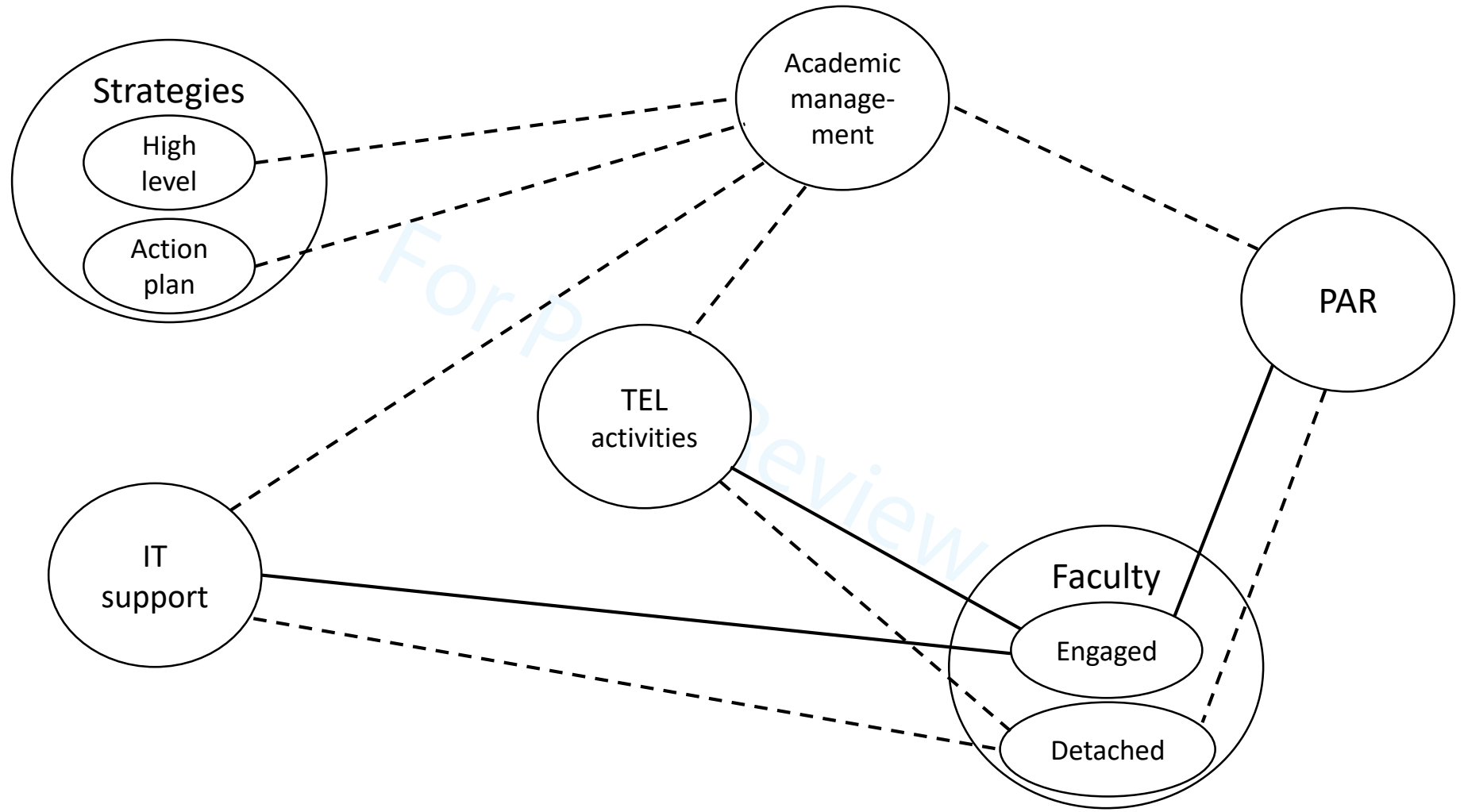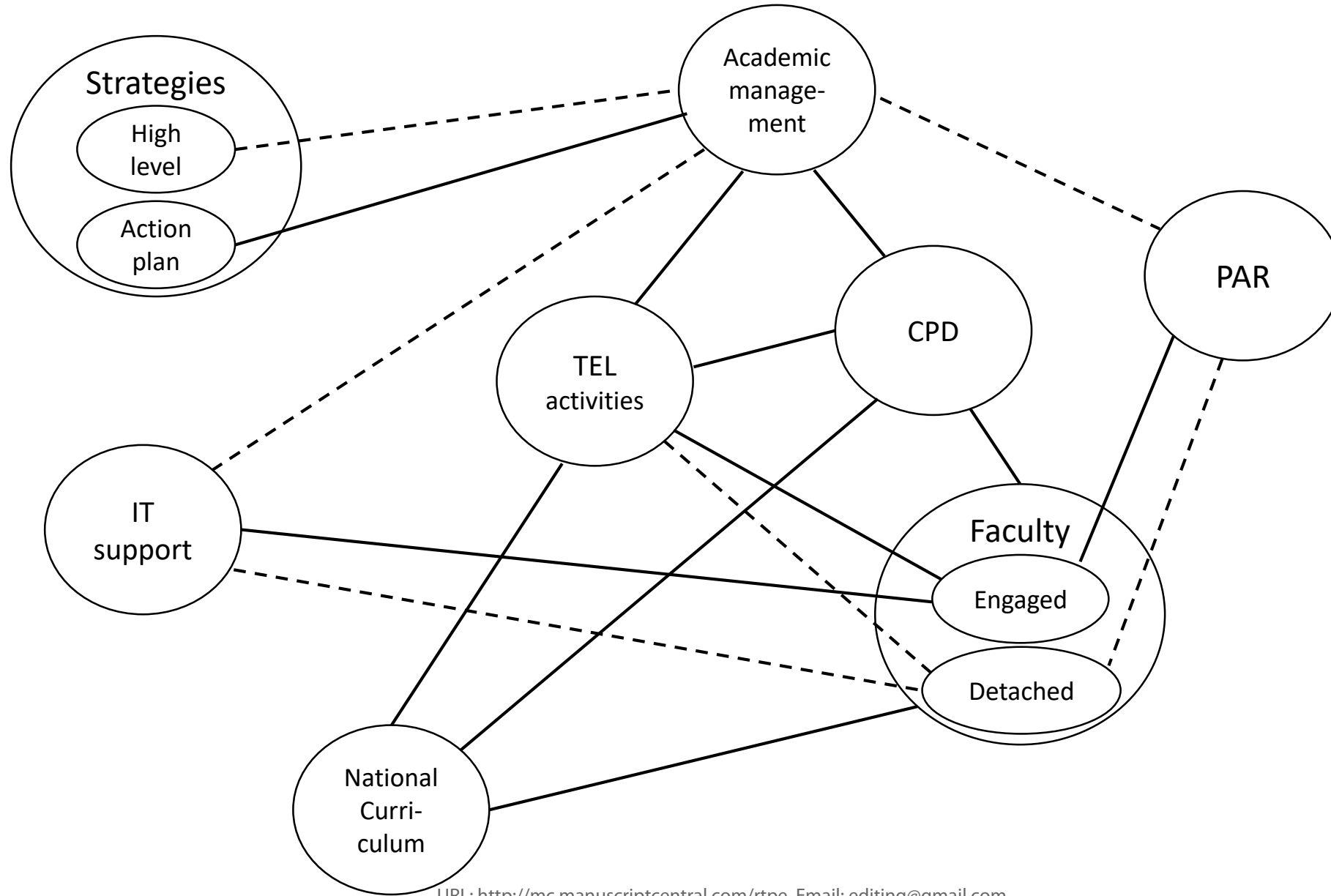
Figure 4. Faculty's opinions on conditions for increasing digital media use

Typical TEL network

Faculty of Education

Strategies

High level

Action plan

Academic management

PAR

CPD

TEL activities

IT support

Faculty

Engaged

Detached

National Curriculum

The role of academic management in implementing technology-enhanced learning in Higher Education

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This article addresses how technology-enhanced learning (TEL) is implemented in Higher Education institutions. The study is based on data collected from a nationwide survey and semi-structured interviews of academic managers. The findings suggest that: 1) members of the academic management staff have limited knowledge of institutional strategies; 2) there is a gap between what academic managers believe they do to support and implement TEL and what other academic staff perceive them to actually do; and 3) TEL is seldom discussed during performance assessment reviews. In addition, the study reveals that academic managers have different understandings of the use of educational technology. Those differences appear to be closely related to the individual managers' assessment of the TEL's role in supporting teaching.

Keywords: technology-enhanced learning; academic management; higher education; sociomateriality; actor-network theory.

Background

Technology-enhanced learning (TEL) has been defined as encompassing various types of "situations in which technology is used to enhance the learner's experience" (Kehrwald & McCallum, 2015, p. 43). In particular, technology is seen as enabling new forms of learning that are better adapted to individual learners (e.g. Hedén & Ahlstrom,

2016). It is expected that TEL will offer a wider range of learners access to knowledge (O'Connor, 2014). The implementation of TEL also aims to provide better platforms for contextual learning and to help close the gap between formal and informal learning environments (Cochrane, 2011). Although definitions vary of what lies within the scope of TEL, the term usually encompasses a wide range of elements, including technology-enhanced classrooms, interactive learning environments and instructional technologies such as peer-to-peer learning applications, participatory simulation and virtual reality.

Within the realm of Higher Education, TEL has raised hopes not only of helping students achieve better learning outcomes, but also of increasing enrolment (Boezerooij, van der Wende, & Huisman, 2007) and reducing attrition (Andersson & Reimers, 2010). Concurrently, Higher Education institutions in many countries are faced with reductions in government funding, despite intensified expectations both for teaching and for research (Maassen & Stensaker, 2011). As a result, universities have embraced TEL as a way to control costs while maintaining teaching quality and student satisfaction. The question of whether TEL actually contributes to cutting costs has so far remained unanswered. Findings from empirical research seem to indicate that online courses are at least as expensive as face-to-face ones (Koenig, 2011).

Because TEL has been implemented in different ways and in institutions with different educational and pedagogical traditions, it is difficult to say anything generic about the effects of TEL on learning, attainment or student satisfaction. Technologies such as screen-capture software (Mayhew, 2017), video podcasts (Mykhnenko, 2016) or webinars (Vogt & Schaffner, 2016) have shown a potential to enhance some aspects of the student experience, but there is still a need for more systematic knowledge on the effects of TEL on learning.

Since the use of TEL aims to improve student learning, contribute to better

quality in education, allow for increased enrolment and help control costs, it is bound to

affect not only students, but also teaching staff, administrators, managers and policy

makers. There are also a number of external pressures to include technology enhanced

learning in institutional policies, for example the European Union's Digital Competence

frameworks (as described in, e.g., Ferrari, 2013). Despite those pressures, previous

studies have uncovered a "substantial gap between the reality of teaching practice in

academia and the rhetoric of institutional policies and governance" (Habib &

Johannesen, 2014, p. 493). In this context, it is interesting to investigate the role of

academic managers, who are in charge of both implementing policies and facilitating

teaching.

Based on this identified gap and previous research, our research questions are as

follows: *a) What are the perspectives and beliefs that underpin TEL strategies in*

Higher Education institutions (HEIs)? and *b) What is the role of mid-level academic*

management in implementing these strategies?

Literature review

A large part of the research on learning technologies focuses on the consequences of

TEL on students and teaching staff. For example, it has been noted that students using

TEL enjoy more flexibility in accessing learning material and can more easily adjust

their pace of knowledge acquisition to their own needs or preferences (Chernikova &

Varonis, 2016). However, students are also faced with new challenges related to

managing their time and taking responsibility for their own learning (Garcia, Abrego &

Calvillo, 2014). Teaching staff report that, although technology provides more

opportunities for student–teacher interaction and increases student engagement, their

time is stretched developing online resources and keeping abreast of technological

developments (Vaughan, 2007).

However, to gain a comprehensive view of the consequences of TEL, there is a need to go beyond the students' and teaching staff's experiences and examine the changes that occur at institutional level. A growing body of literature aims to describe how institutions are responding to the changes in teaching and learning that are sparked by new technology. Some studies have described different types of institutional strategies adopted as a response to TEL, such as 'back to basics', 'stretching the mould' and 'worldcampus', as suggested in Boezerooij, et al. (2007). Others have sought to identify the various stakeholders that partake in the processes of choosing and implementing TEL (Cook, Holley, & Andrew, 2007). Still others have addressed the issue of the relationship between institutional policy and organizational culture (Czerniewicz & Brown, 2009). Finally, some have explored the institutional issues related to the deployment of TEL through the lenses of institutional support and staff development (Almpanis, 2015).

Walker, Sloan, Boyle & Walsh (2011) describe organization-wide practitioner engagement and strategy ownership as central to the process of integrating TEL into organizations' wider strategic frameworks of teaching and learning. Other researchers have emphasized the importance of non-managerial roles, such as the 'educational technologist' role, in institutions that aim to enable TEL. Such roles may fail to gain institutional legitimacy because they are often related to fixed-termed projects and do not carry the same status or recognition as other mainstream academic and/or professional roles (Shurville, Browne & Whitaker, 2009). More generally, the research literature available on TEL underlines the need for an institutional strategy that sets aside sufficient resources to enable implementation of the technology and sufficient guidance to allow users to feel comfortable with the technology (King & Boyatt, 2015).

Higher Education is typically an arena where top-down interventions and bottom-up grass-root initiatives might co-exist. In that context, it would be interesting to know more about the role of academic managers who are directly or indirectly in charge of organizing the work and assessing the performance of teaching staff in an academic department or sub-department. It has been pointed out that the role of academic managers is often contested or misunderstood (Rudhumbu, 2015). Winter (2009) describes academia as split between "academic managers", who have embraced a corporate management style and "managed academics", whose values are incongruent with managerial discourse. Such a dichotomist view has been challenged, for example in Preston & Price (2012), who consider academics who take up a management role as both "academic managers" and "managed academics". To our knowledge, little is known about how academic managers relate to and unite the top-down and the bottom-up approaches to TEL implementation and deployment.

Theoretical framework

This study lies at the crossroads of educational research, technological research and organisational research. There is a wealth of management and organisation theories that could be used to shed light on the organisational aspects of our research questions. However, those theories are usually more focused on issues such as governance and resource management, which might overshadow the deeper, more complex relationships between managers, academic staff and the technologies that they use, are meant to use, or wish to use in order to enhance the quality or effectiveness of their teaching. Our research questions call for a theory that provides more scope for a richer understanding of those relationships.

There are also a number of limitations to many of the theories used to make

sense of technological development in education. Research into educational

technologies is often based on theories describing processes of diffusion, based on the

works of Rogers (1962) and acceptance, based on the works of Davies (1989). An

example of the use of diffusion of innovation theory in education can be found in

Martin, Parker & Allred (2013). Others such as in Mu-Yen, Mou-Te Chang, Chia-Chen,

Mu-Jung & Jing-Wen (2012) have adapted the technology acceptance model to

educational research. However, such theories tend to view technological artefacts as

inherently static and generally serving one constant and consistent set of purposes. In

that respect, those theories might not be most suited to understanding phenomena in a

sector such as Higher Education, which is undergoing profound changes related to

increasing student numbers, higher expectations in terms of student employability and,

in many countries, budget cuts (see for example W. Watson & Watson, 2013). There

may therefore be a need for a theory that provides a framework that is flexible enough

to describe a constantly changing landscape while being structured enough to present

findings in a coherent manner.

    Learning and teaching are complex phenomena that tend to involve not only

humans and technologies, but also a number of physical artefacts, such as classrooms

and buildings, and non-physical artefacts, such as organisational structures and

strategies. In order to provide a broader view of the dynamic range of uses and

understandings of learning technologies, we have looked for an explanatory framework

that acknowledges the complexity of the relationships between technological artefacts,

their users and the organizational entities to which these users belong, while leaving

room for nuance. Sociomaterial theories and approaches appear to have enabled deep

insights into the interplay between physical entities, social and cultural practices, and

values in a number of fields, and to have found particular resonance in the field of

education (Fenwick, Edwards & Sawchuk, 2011). Approaches that combine the social and the material have been found particularly fruitful when studying Higher Education, where non-material entities such as knowledge practices interact with humans in a unique way. Academics are meant to generate knowledge and guide students in their engagement with new knowledge, whereas administrators are meant to support such practices (Fenwick & Edwards, 2014).

Amongst the various sociomaterial approaches that have been developed over the years, actor–network theory (ANT) appears to be particularly suitable to the study of Higher Education as it offers a means of exploring not only the learning technologies themselves, but also the whole landscape within which they are imagined, used and shaped. ANT was originally developed to provide a supple framework for investigating scientific practice (Latour, 1987; Latour & Woogar, 1979) but has proved useful in areas as diverse as economics (Callon, 1991), medicine (Mol & Law, 1994), archaeology (Deal, Daly & Mathias, 2015) and education (Sørensen, 2009; Fenwick & Edwards, 2010). ANT has been described as "a sociology of association" (Latour, 1986, p. 277), as it considers how humans and non-humans are tied together through a number of heterogeneous networks. By studying how social projects are joined together, it allows for a way to trace how they are formed and how they have evolved (Tummons, 2010). The premise of ANT is that human agency cannot be assumed to be the only or even the primary motor in social processes, and that non-human actors (or 'actants') need to be considered as an integral part of any social process (Latour, 2005; Gourlay, 2015).

The two research questions that form the basis for this study, *1) What are the perspectives and beliefs that underpin TEL strategies in Higher Education institutions?* and *2) What is the role of mid-level academic management in implementing these*

strategies?, both involve studying a large range of interconnected elements. Such

elements include physical artefacts (for example, the various information and

communication technologies that form the basis for strategy), non-physical artefacts (for

example, the procedures and routines that are followed when drafting strategies) and a

wide spectrum of stakeholders (including decision-makers, mid-level academic

management, academic faculty, administrators and students). The challenge for the

researcher is to make sense of the interconnectedness of those various elements without

being reductive. In that context, a socio-material approach such as ANT appears to be

an appropriate tool to make sense of the complexity of the interaction between artefacts

and humans and capture the dynamics of their relationships.

In our analysis, we have used a relatively limited number of ANT concepts. We

have focused particularly on the notions of 'networks', 'human actors', 'actants',

'translation' and 'enrolment', since these appeared to be the most useful when trying to

make sense of the complexity of TEL in a Higher Education context. The main tenet of

ANT is that the world around us can be understood to be made of interconnected

'heterogeneous networks'. The heterogeneity of those networks lie in the fact that they

include both 'human actors' and 'non-human actors', also called 'actants'. Actants can

belong to the biological world, including animals, bacteria and viruses. They can also be

physical artefacts such as a key or a car, or more abstract artefacts, such as software,

mathematical concepts, or organisational routines.

'Translation' in ANT refers to the process of mediating the discourse or the

needs of others with the help of words or actions (Callon, 1986; Latour, 2005). In that

sense, humans can become spokespersons for non-humans and vice versa (Guggenheim,

2015). One of the most interesting aspects in the process of translation is that it

necessarily involves a process of modification (Barry, 2013). It has also been suggested

that processes of translation can result in the creation of a particular view of reality, where some elements of that reality are "made to matter" while others are "made not to matter" (Valkenburg & Van der Ploeg, 2015, p. 329).

The notion of 'enrolment' is closely related to that of 'translation'. It refers to processes of persuasion or encouragement, with various degrees of coercion, which take place when various actors and actants create alliances with each other to achieve one or several goals (Callon, 1986), thereby creating communities of practice (as described in, for example, Vickers & Fox, 2010). Petersen (2009) explores the use of enrolment in Higher Education through the lens of "discursive rationalities and practices" (p. 409) that impact academic work in a way that makes workplace resistance or non-compliance difficult.

Method

Rationale for a mixed-method design

The rationale behind a research design that mixes both quantitative and qualitative methods is that these two methods are complementary and provide the basis for an analysis that is stronger than it if only one type of method were used (Ivankova, Creswell, et al., 2006). Introducing a qualitative component to this research appeared to be particularly useful, considering that the research questions addressed issues such as beliefs, perspectives and role understanding, which are difficult to articulate fully in a quantitative survey (as pointed out in Alvesson & Skölderberg, 2009). Qualitative insights also form the backbone of sociomaterial research, which aims to gain a deep understanding of the actions, opinions and intentions of a large variety of human actors as they interact with each other and with non-human actants (Shehaan, 2011).

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National survey and semi-structured interviews

The data for this study were collected through a mixed method approach, drawing on two main sources. The first source of data was a national survey on e-learning and technology-enhanced learning that was sent to all institutions of Higher Education in Norway. Results were available at both the national and the institutional level (Norwegian Agency for Digital Learning in Higher Education, 2015). Examples of questions asked to academic managers are: "What opportunities do you see regarding the use of digital media in teaching in your department/section?"; "How do you organise work around the use of digital media in your department/section?"; and "How do you raise the academic staff's level of proficiency in using digital media to support their teaching activities?". Examples of questions asked to non-managerial academic staff are: "What opportunities do you see regarding the use of digital media in teaching?"; "What are the main reasons why you are using digital media to support your teaching activities?"; and "Do you need more competence/proficiency in using digital media to support your teaching activities?"

The second source of data was a series of 12 semi-structured interviews with academic middle managers (heads of academic departments or heads of academic sub-departments) in a large state-owned university college in Norway. It may be noted that the quantitative data related to this institution were based on eight managers and 25 members of the academic staff with no management role.

Participants to the quantitative survey

The survey conducted by the Norwegian Agency for Digital Learning in Higher Education was sent to 445 academic managers, who were asked both to answer an "academic manager survey" and to forward a link to an "academic staff survey" to members of their academic staff. The academic manager survey was designed to take 15

to 20 minutes to complete, while the academic staff survey was designed to take

between 20 and 25 minutes. The total number of respondents for the national survey

was 235 academic managers and 1072 members of academic staff. Among the 235

academic managers, 200 were deans or heads of departments while 33 were heads of

studies or heads of section. The data from the quantitative survey is by nature

descriptive. In addition, the numbers of respondents from the institution under

investigation was relatively small. In this study we identified a number of topics as a

point of departure for further investigation, which we aimed to be deeper and richer, and

therefore chose a qualitative approach.

Participants to the interviews

The interviewed managers were recruited from all of the institution's faculties and

included two levels of academic middle management. The first level consisted of the

heads of the academic departments, who operated at the third level of the academic

hierarchy (below the deans of faculty and the president of the university college). The

second level consisted of the heads of the academic sub-departments, who operated at

the fourth level of the academic hierarchy (just below the heads of the departments). All

heads of departments (19 in total) and heads of the largest sub-departments (five in

total) were contacted via email. The rationale behind contacting heads of departments

and heads of large sub-departments is that academic managers at those two levels are

involved both in implementing strategy and in the daily running of the department. Of

the 24 academic middle managers that were contacted, 12 agreed to be interviewed, ten

heads of department and two heads of large sub-departments. The respondents were

from all four faculties at the studied university college: the Faculty of Social Science,

the Faculty of Education, the Faculty of Health Sciences and the Faculty of Technology,

Art and Design.

Each interview was conducted by a research assistant to ensure anonymity, and lasted between 60 and 90 minutes. The interview questions were open-ended, and covered the areas highlighted in the national survey, for example: "How do you implement the institution's strategy in the day-to-day running of your department?"; "How do you motivate academic staff in your department to use TEL?"; "What factors, in your opinion, facilitate the use of TEL in your department?" "What factors would you say impedes the use of TEL in your department?".

The interviews were recorded, transcribed in their entirety, anonymized and analysed by both authors of this article. The analysis was carried out first individually by both authors, then together, each time along the lines of the main ANT concepts that were identified as most central. The main aim of the first reading of the qualitative data was to identify the various 'networks' and to describe the 'human actors' and non-human 'actants' that make up those networks initially. In a second reading of the data, the focus was on identifying instances of 'enrolment' and 'translation' within those networks. As we identified lists of themes from the data, we tried to find ways to group those themes under a number of categories that emerged as central. The ANT concept of 'generalized symmetry', that allows to consider human and non-humans and members of the same networks, provided us with a useful tool to organize the identified themes into categories. For example, we found that non-human actors such as the Performance Assessment Review, and the formal "work plan" that academic members of staff are attributed at the beginning of each semester, are both 'enrolled' by human actors, such as the academic managers and the academics themselves, thereby creating a rather strong network that we called "academic management". This hybrid network provided us with a useful analytical category to interpret the data, as will be outlined in more detail in the next sections of this article.

Findings

This section is structured as follows. In the first subsection, we present the quantitative

data gathered through the survey. In the second subsection, we present the qualitative

data gathered through the qualitative portion of the study. In both sections, we try to

answer the two research questions that are: *1) What are the perspectives and beliefs that*

underpin TEL strategies in Higher Education institutions? and *2) What is the role of*

mid-level academic management in implementing these strategies?

Survey data

The results of several of the questions asked in Norway's national survey on digital

tools in Higher Education show that there is still a substantial gap in perceptions of

success factors between management and academic staff (Norwegian Agency for

Digital Learning in Higher Education, 2015). This gap had already been identified in the

2011 survey (Norwegian Agency for Digital Learning in Higher Education, 2011) and

was at the same level in the 2014 survey (Norwegian Agency for Digital Learning in

Higher Education, 2015).

Management and faculty views on the implementation of digital tools/media

From the national survey numbers specific to the institution under investigation, the

following results were related to digital tools/media in Higher Education:

[Insert Figure 1 here]

Figure 1. Academic management's opinions on the implementation of digital media

[Insert Figure 2 here]

Figure 2. Faculty's opinions on the implementation of digital media

Data from the 2014 survey show that management, to a large extent, reports (strongly agree and agree) that academic staff are involved in mapping needs for (90%) and choices of (85%) digital tools/media, while academic staff themselves report that their involvement is lower (26% and 37%, respectively).

Furthermore, management state that they, to a high degree (86%), support the academic use of digital tools/media. However, academic staff report lower management support of the academic use of digital tools (22%). Although the question is only asked to managers, it is interesting to note that those managers to a high degree (87%) report that their management roles are important in a TEL setting. On a different, but related question, academic staff report low figures (20%) when asked about their perceptions of management support for the academic use of digital tools/media. In addition, academic staff report that the use of digital tools/media is not a part of the performance assessment review (PAR; 2% states that this use was part of the PAR).

The only topic upon which the answers of the management and the faculty members coincide is whether the use of digital tools is initiated by academic staff. The management report that 65% of TEL projects are initiated by academic staff, while the academic staff report 66%.

Management and faculty views on conditions for increasing the use of digital tools/media

From the national survey numbers specific to the institution under investigation, the following results were related to digital tools/media in Higher Education:

[Insert Figure 3 here]

Figure 3. Academic management's opinions on conditions for increasing digital media use

[insert Figure 4 here]

Figure 4. Faculty's opinions on conditions for increasing digital media use

When management and academic staff are asked about important conditions for increasing the use of digital tools/media, the data reveal some differences between the two groups concerning the importance of financial incentives. While 37% of management reports that financial incentives are important or very important, only 24% of academic staff thinks the same. At the same time, 36% of management reports that financial incentives are *not* important, compared to only 14% of academic staff. With regard to all the other factors for increasing the use of digital tools/media (such as competitiveness, student expectations, development projects, mandatory training, curriculum requirements, enthusiasts, management, strategies and action plans), the results of the management survey and the faculty survey largely concur. The quantitative findings point to a situation in which both faculty members and their management concur that a number of factors are important to increase the use of digital tools in their department(s). The notable exception to this trend is the issue of financial incentives.

The role of management and academic staff in supporting TEL

One difference that appears to be important between management and academic staff concerns the extent to which each group is involved in supporting TEL. The managers believe that they are heavily involved in supporting TEL, while the faculty consider management's actual involvement to be limited. The managers also report that the

faculty are heavily involved in the processes of mapping needs and choosing tools, while the faculty themselves report that they have little opportunity for involvement. In addition, there seems to be a low level of awareness of strategies both among management and among faculty. Based on these findings, it is interesting to investigate further the issues of strategy, technology use, support, diffusion and management.

Interview data

The findings from the quantitative data provided a basis for further investigation using qualitative methods. Five themes emerged from the quantitative data which formed the basis for the interview guides: 1) the managers' understanding of strategies; 2) the notion of technology use; 3) ICT support; 4) ICT diffusion and staff engagement; and 5) the role of academic management itself. In this section, we present the findings within these five areas.

Understanding strategies

Generally, the interviewees seem not to be aware of any relation between institutional strategy on the one hand and strategy at the faculty level and plans of action for departments on the other. Some interviewees report having little knowledge of institutional strategies for TEL, stating that they rarely work with translating TEL strategies to their own management levels. Statements such as "There is nothing about this [ICT strategies] at all in our action plans" (Interviewee 4) and "[faculty] probably regard this [campus-wide TEL strategy] as yet another strategy that's kicking around" (Interviewee 9) illustrate these findings.

Some informants state that they do not experience clear demands or pressures from their academic managers at the faculty level to implement TEL. Rather, they have a tacit understanding that there is a general expectation that TEL is to be implemented,

but not much has been said regarding the pace of this implementation. One informant states: "There are not very many expectations [from the higher levels of management]; we are rather at the trial stage at the moment" (Interviewee 4). This quote illustrates that having at least begun TEL implementation might suffice as a token of departmental involvement in TEL. Another informant reports that the general management approach at all levels is to favour voluntary initiatives in the implementation of TEL: "It is more like a carrot approach, rather than a stick approach" (Interviewee 6).

There is, however, one exception to the situation described above, namely the Faculty of Education. Mid-level managers in the Faculty of Education show noticeably deeper engagement in implementing TEL strategies. This coincides with a greater awareness of the link between strategies adopted at the institutional level and the development of strategies at the various other levels of the institution. In particular, one informant (Interviewee 10) emphasizes that she and the rest of her unit are working steadily to translate the central strategy at the local level, thereby illustrating her familiarity with the tenets of the central strategy. Another manager at the Faculty of Education illustrates her willingness to commit to the strategies by saying, "We are in front, nationally. This has been a conscious choice [by the department] for several years" (Interviewee 12).

When trying to analyse the findings from an ANT perspective, it appears that there is a network of human and non-human actors consisting of central strategies, local action plans, and managers themselves. This network is somewhat unstable, particularly because the link between local action plans and central strategies is generally weak, with only one exception: the Faculty of Education. In the other faculties, members of the various management teams seem to have more ownership of the departmental action plans than of central strategies. This may

explain why action plans have been developed without any clear integration of

central strategies. In ANT terms, this could be explained by a lack of negotiating

power over the central strategies. Since there is generally little pressure

throughout the organisation, departmental managers have de facto free rein to

carry out their action plans independently of central strategies.

However, compared to the other faculties, the department heads in the Faculty of

Education have a completely different approach to implementing central strategies.

Since they are in the same organisation as the other departments, it is natural to

hypothesise that this is due to one or more other influential actants. One of these actants

might be the National Curriculum, which is used by Norwegian authorities to pave the

way for the digitization of both primary and secondary schools and to digitize teacher

education. Managers can be said to use the national authorities strategically as allies to

facilitate the digitization of educational programmes.

Notion of technology use

The interview data reveal a diverse understanding of the notion of technology use.

Many of the interviewees report using a number of software programmes and

other digital tools relevant to the professional programmes in which they work or

to the particular subject areas taught within those programmes. For example, one

informant from the Faculty of Education discusses professional tools for teachers,

such as Smartboards, and explains why training students in using Smartboards is

important to meet high expectations regarding the practices of working life

(Interviewee 6).

When discussing e-learning or learning technologies, interviewees do not

generally differentiate between the profession-oriented technological tools used to

train students to become professionals and the technology aimed at enhancing

learning. For example, one informant states, "In this department, there are a lot of

different technologies that are included in the bachelor and master programmes.

As mentioned, my faculty is very engaged in the use of digital tools.

Consequently, they manage themselves when it comes to e-learning technology"

(Interviewee 8). However, some informants report using digital tools aimed solely

at supporting the teaching and learning processes. Throughout the data set, there

are indications that the notions of technology use and of TEL in particular are

unclear. One informant is particularly straightforward about this when she says,

"To me, the e-learning thing is a bit of a blur" (Interviewee 4).

When examining the findings related to the notion of learning technology,

we find that the ANT concept of translation is a useful analytical tool. In an ANT

context, actors or actants are translated by other actors, who interpret or

reinterpret their original roles, interests and goals (Callon, 1986). Our analysis of

the interviews reveals that the various managers translate the notion of technology

use differently, thereby reflecting the status given to different types of technology.

While some learning networks rely on the belief that technology that supports

teaching and learning has high status, other learning networks are built around the

notion that technology used as part of professional practice is more important. When

asked about what they have achieved, the managers answer within the rationales of the

networks in which they are most successful. This situation transcends faculties and

academic fields. For example, managers in engineering courses emphasize the

programming curriculum, while teacher education emphasizes training in use of digital

tools in primary schools.

ICT support

When asked about their expectations regarding the role of ICT support in backing up

TEL implementation, many of the informants answer that they are mostly indifferent.

Some informants do not regard the level of support as a problem because they do not

report on many TEL activities. One informant expresses their indifference as follows:

"We have not experienced this [support] as problematic. However, we have not

challenged them [ICT support] much either. So far, we have not needed much support"

(Interviewee 4). Other informants representing educational programmes with high

technological competence convey another type of indifference. They state that they

need little support because their department is self-reliant: "I think my faculty is able to

fix this itself" (Interviewee 8). In contrast, educational departments that already have

begun implementing TEL, but that do not have a generally high level of technical

competence, report that the IT department fails to deliver necessary services. As one

interviewee noted, "It [ICT support] could have been better. It seems like people

[faculty] need to figure out themselves how to use it [technology]" (Interviewee 9).

ICT support is an actant with two different roles within the various networks that

have grown throughout the institution. In those networks in which TEL is minimally

emphasised, the notion of ICT support is marginal and has little visibility. In other

networks that are more eager to implement TEL, ICT support is regarded as either

unsatisfactory or redundant. This seems to lead to the belief that self-reliance might be a

key element in the appropriation of TEL. Maintaining an organisational entity outside

the individual academic departments to provide ICT support is challenging, since

delivering support might be much less important than disseminating knowledge about

TEL amongst the members of the department staff.

The ANT concept of *enrolment*, which is part of the process of *translation*, could be useful for understanding the situation described here. *Enrolment* refers to processes whereby an actant is attributed a role that binds it to the other actants in the network. It seems that the networks that surround TEL implementation fail to enrol ICT support, either by not expecting much from this support or by avoiding this support altogether and dealing with technical problems themselves. However, this apparent failure to enrol ICT support may have long-term consequences, potentially threatening both the stability and the strength of the network.

Diffusion and engagement

On the whole, the interviewed managers show little interest in technology-supported learning activities. When asked about what they do to engage colleagues, managers indicate that they welcome grassroot initiatives: "We very much appreciate when initiatives come from the grass roots, to put it that way" (Interviewee 2). At the same time, they clearly state that they do not want to exercise coercion to gain results. As one explains, "At an individual level, we do not make demands. We seldom use demands [as a managerial tool]" (Interviewee 6). On the other hand, as one of the academic managers reporting high degrees of competence in technology says, "I have really never needed to arrange for anything because my faculty [are] engaged users of digital tools" (Interviewee 9).

The management reports that faculty members older than 50 or 60 in particular are more reserved when implementing TEL, and that the management accepts this. As one management interviewee explains, "Some faculty are somewhat older, and do not think that this [TEL] thing is any fun at all" (Interviewee 1). They also report that they think their employees face stressful working situations and that implementing new

technologies and new ways of teaching is time-consuming. Some managers acknowledge that such implementation requires allocating time in the work plan. For example, Interviewee 4 suggests that there is a need for "[having] some more [allocated] hours on the work plan to learn about these things" (Interviewee 4). Others consider the work plan to be a part of the job and do not acknowledge the need to dedicate time beyond that allocated for other tasks (Interviewee 10).

Respondents report that there are few systematic arenas for dissemination and exchange of ideas, and that those lie outside the realm of formal structures. When asked about arenas for dissemination, informants typically respond with "They are mostly informal" (Interviewee 4). One informant even refers to the process of implementing TEL in terms of helping others in "hard times", conceptualising the issue as a difficult endeavour. However, the Faculty of Education reports that there are several arenas for systematic dissemination, such as staff meetings, research seminars and programmes for internal continuing professional development (CPD). As one interviewee puts it, "We have our own way of doing it, called 'teacher-education school', where one of the faculty members with experience in the use of flipped classrooms provides lectures on how she is using it" (Interviewee 6).

In response to a question asking whether they have felt pressure from students to use TEL, faculty respond that they do not. However, one informant notes that the use of online videos (for example, through sites like YouTube) has been suggested by several students, stating, "They [the students] ask to get access to material on [the] internet when possible" (Interviewee 9). Another emphasizes the existence of a resource problem. She reports that, through their course evaluations, students request that videos be published online. However, she also questions whether the extra workload for the teacher is justified in terms of better learning for the students (Interviewee 4).

Managers seem to ally themselves with a number of human and non-human actants when deploying TEL. TEL enthusiasts, who have high levels of technical knowledge and interest in TEL, are major actors because they are seen as primary sources of inspiration for their colleagues. Relying on these human actors allows managers to free themselves from other, non-human, actants, such as formal requirements for work plans, action plans and strategies that might need to be embedded in formal tools. Various statements gathered from the interviews reveal that competencies in subject-specific and educational technologies are equally important and relevant for TEL implementation.

Managers do not pressure older or less interested teaching staff into the TEL enthusiast network, and they seem to accept that there are two separate networks: one of TEL enthusiasts and one of faculty members who are either indifferent to or hostile towards TEL. These two networks appear to have little to do with one another. It is interesting to see that the network constituted by the enthusiasts (including faculty members and students), also includes a number of strong non-human actants, such as technology, technical knowledge and TEL routines. Another non-human actant, which might not be immediately apparent, is the dissemination arenas, such as continuing professional development. These are less visible because they are primarily informal. Although they play an important role in TEL implementation, they are limited to their respective networks. Throughout these more or less visible non-human actants, the network of TEL enthusiasts associates itself with another actant: the central strategies, without which TEL implementation would not be possible.

Academic management

Our data material does not indicate a strong and active management role in TEL implementation. Statements like "I support initiative on streaming lectures" (Interviewee 7) illustrate a rather offhand attitude, in which managers support initiatives from below rather than developing strict action plans for TEL implementation. The practice of referring to several initiatives by the name(s) of the engaged staff illustrates the bottom-up, rather than institutional, organization of the activities.

When asked about TEL initiatives within their own departments, some managers address the issue by referring to distance education courses (online learning classes): "Online courses [are] one way of organising master programmes and continuing professional development to ensure that they [students] have a job to go to. This is a need that we believe is fulfilled through online courses" (Interviewee 4).

Finally, when asked whether implementing TEL is a part of the PAR, respondents report that this is not the case: "To a very small degree, I believe. This is only a topic for those that are particular interested in it [TEL]" (Interviewee 6). Based on the data, we can conclude that the topic is only brought into the PAR when an employee is already engaged in TEL activities.

The lack of concrete plans for dissemination and the way that TEL initiatives are described in terms of individual initiatives indicate a lack of managerial planning for initiating TEL activities. These findings are supported by the quantitative data that illustrates the gap between management and faculty understandings of the management's role in implementing TEL. Furthermore, e-learning initiatives (online courses) seem to serve as an alibi for fulfilling TEL demands, and, thus, are used to legitimize low effort levels for other TEL activities, such as blended learning and training in the use of digital tools.

In ANT terms, management tends to describe TEL activities by referring to existing and emerging networks rather than focusing on building new networks or enrolling more actants into existing networks. Under such direction, technology-related activities can grow into an excuse for doing nothing new, thus hampering the enrolment of new actants into existing networks.

The question of whether TEL activities are discussed during the PAR was introduced in the 2011 national survey. It was therefore natural for us to introduce follow-up questions in the manager interviews. Although the survey data only included a question about PAR for faculty respondents, the results are interesting for our study, as they point towards TEL activities being rarely discussed during PARs. Paradoxically, it seems that the topic is only brought up during PARs when academic staff are already engaged in various activities, and not as means to enrol new actants into the TEL network.

Discussion and conclusion

Our analysis of the data has helped us identify a large and constantly evolving range of human and non-human actors that seem to play roles in managers' and teaching staff members' understandings of the potential and usefulness of learning technologies, as well as in the strategic decision-making processes in which they participate. The interrelations and interactions between the various actants were found to be of particular importance. Acknowledging the interdependencies among a set of hybrid actants was crucial to understanding how these actants influence, enable and disrupt each other. Our analysis draws on the explanatory power of the descriptions of these interrelations.

Our research suggests that members of academic management staff have little or no knowledge of high-level strategies, either general or TEL-related. Typically, these

staff members are more focused on developing action plans at the departmental level than on linking these plans to overall strategies. This is in line with previous findings from the literature (Czerniewicz & Brown, 2009; Walker, et al., 2011). In addition, both the quantitative and the qualitative data point towards a paradox regarding the role of management. Managers regard themselves as important in the implementation of TEL, yet the issue is hardly ever discussed during PARs unless faculty are already very active in TEL initiatives.

The quantitative data indicates that there is a gap between what managers believe they do to support and implement TEL and what their academic staff perceive them to actually do. Although only managers are interviewed in the qualitative part of the study, their responses confirm the existence of such a gap. For example, when asked about their contributions to TEL support and implementation, the interviewed managers refer exclusively to TEL initiatives that are already well under way. They do not mention taking any initiative themselves or motivating others to do so. The existing literature on the topic (Almpanis, 2015) provides a similar perspective on institutional support.

An interesting distinction emerges from the data between academic managers and managed academics. Although those two groups share a common academic identity and similar aspirations on behalf of their institution, their paths towards achieving their goals seem to differ noticeably when it comes to TEL. The managed academics, at least those who are most engaged in TEL activities, seem to work hard to enroll TEL into their academic practice. The academic managers, on the other hand, seem to be rather detached from the day-to-day running of TEL, and are generally disconnected from TEL activities.

A typical network in the institution that we investigated can be described as involving six major actants: the institution's strategies, the academic management, the IT support staff, TEL activities, the faculty members, and the PAR (see Figure 5). In this network, the academic management and the institution's strategies are only loosely connected. The academic management also appears to be only loosely connected with the IT support staff, the TEL activities and the PAR. Among faculty, only the engaged faculty members are tightly connected to IT support, TEL activities and the PAR, while the more detached faculty member only have a loose connection to those three actants.

[Insert Figure 5 here]

Figure 5: Illustration of a typical TEL network in the institution under investigation

It is interesting to note that the results for one of the faculties differ notably from those for the other three. This may be due to the faculty's strong ties to the national authorities and to the digitization of the wider educational landscape, which includes primary and secondary schools. For both managers and academic staff, this unique relationship with the government builds, at the faculty level, a common identity that allows everyone to focus on TEL. This strong sense of identity throughout the management level may explain why broad TEL strategies are implemented all the way down the organisation at this faculty. This points towards a common culture, as mentioned in Czerniewicz & Brown (2009).

When describing this situation in an illustrative figure (Figure 6), we see that the academic management at the Faculty of Education, although they are only loosely connected with high-level strategies, have a much tighter relationship with the strategic

action plans. This, in turn, leads to the appearance of two new actants in the network, namely the National Curriculum and continuing professional development (CPD). Because the National Curriculum sets the tone for many of the activities offered in the CPD of school teachers, and because this type of students is highly reliant on TEL, those two actants are closely related to each other, as well as to the TEL activities. The Faculty as a whole has a distinct ownership of CPD activities and a deeply rooted relationship with the National Curriculum, which we have illustrated as a full line between Faculty and CPD, and between faculty and National Curriculum.

[Insert Figure 6 here]

Figure 6: Illustration of a typical TEL network at the Faculty of Education at the institution under investigation

We need to acknowledge the limitations of this research study, both in terms of methodology and in terms of results. Methodologically, it is challenging to use a mixed method with both quantitative and qualitative elements within a theoretical framework such as ANT, which is mostly interpretative and has little tradition for building on quantitative results to identify relevant qualitative questions. Another limitation is that the qualitative data was gathered only from academic managers, while the issues that emerge from the data are also relevant to other stakeholders such as members of the academic staff, students, university administrators, IT support staff and learning technology developers. A further qualitative study in which those voices are also heard would be a natural continuation of our research.

Another area for future research might be prompted from the finding that there appears to be a certain ambiguity over the use of the word 'technology' in Higher Education. There are at least three types of technology use in HEIs, and these form

different networks of understandings of success. The aim of modern Higher Education

is to apply digital tools and communication in the delivery of education (e-learning) to

increase quality and efficiency. This sort of technology use is, in principle, the same for

all kinds of educational programmes and subject areas. Another type of technology use

is related to particular subject areas, such as programming in engineering, digital tools

in radiology, or Smartboards in teacher education. This kind of technology use might

serve as a kind of alibi in self-analyses of the degree of technology use. Finally, there

are educational areas in which technology use is a regulated part of the field of praxis.

This is true in particular in teacher education, where students at all levels are supposed

to be trained in technology use. While the distinction between the three types of

technology was clear to us as researchers, it appears that this distinction was often

unclear to the respondents. As a result, the respondents' self-evaluations of how much

they use TEL might not always be reliable. This opens new avenues for future research,

whereby researchers might consider investigating the reasons behind the various

understandings that academics and academic managers have of technology as a tool for

learning.

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