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Liberating teachers from the dominant theories and the unquestioned mission: Towards ‘disruptive theories’ in technology enhanced learning research

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Abstract

In Technology Enhanced Learning (TEL) research, technology is commonly perceived as an innovative tool to “enhance” the quality of pedagogical experiences. The assumptions that the introduction of new technology has brought about a more effective learning paradigm into current classrooms have rarely been challenged by TEL researchers. In this context, teachers are often considered as important actors who are responsible to achieve the urgent mission of TEL, which is to effectively integrate new technology in classrooms. However, this article argues that such blind faith in TEL can have ramifications in actual educational contexts. It is mainly because this blind faith can determine what is possible or impossible for teachers in enacting their pedagogical beliefs, and thus, in imagining alternative educational scenarios for their students.

This paper, therefore aims to reveal how dominant theories in the TEL field, largely drawn from the common assumptions of an educational role of technology, produce a set of imperative claims about teachers and their subjectivity in the field of teacher education. By doing so, this research intends to envision new roles of theory in TEL research, arguing that ‘disruptive theory’ can help us to challenge the common, but uncritical assumptions prevailing in TEL and further open unique opportunities for more critical debates. The first part of the paper will conceptualise

theory as discourse and describe a methodological approach utilised in this critical literature review project. The second part will critically review different theories in a set of scholarly journal articles (N=33) concerning TEL-related teacher education, highlighting the dominant, but limited ways in which the theories have guided knowledge construction in those articles. Three themes (i.e., building, medicalising, expanding) have been identified as common actions of theories in TEL research through the authors' open coding process. The third part will point out the taken-for-granted assumptions in which TEL theories are commonly rooted. It continues to discuss alternative and imaginative ways in which theory can inspire TEL research based on three disruptive roles that a TEL theory may take. The disruptive theories are essential to challenge taken-for-granted assumptions with imaginative thoughts which seem to be dormant in TEL research. They may contribute to liberating teachers from the dominant theories and the unquestioned mission and further empowering them to be able to create their own pedagogical possibilities and ultimately, may contribute to freely educating their students.

1. Introduction

Technology integration in education has been told as one of the most urgent and inevitable tasks to 'innovate' the quality of learning and teaching experiences for over a few decades. Current educational research often starts from the call by referring to "the rapid advancement and growth of technologies" (Scherer, Tondeur, & Siddiq, 2017, p. 1) or from the benefits by claiming "the effective use of technology contributes positively to learners" (Bahçivan, Güneş, & Üstündağ, 2018, p. 399). Teachers correspondingly are expected to be properly trained for the use of technology since they are regarded as 'the driving forces' of technology integration (see Tømte, Enochsson, Buskqvist & Kårstein, 2015). It is even mentioned that the use of technology in education can no longer be thought of as a choice to be made on the part of teachers, nor can it be considered an add-on to the curriculum or reserved for special occasions in the classroom (DelliCarpini, 2012, p. 14). Scholarly discussions among teacher educators and researchers in the field of Technology Enhanced Learning (hereafter, TEL) have been devoted to these urgent calls by proposing new theories, testing them, and developing them. Considering the aforementioned, it is not difficult to notice that theories in teacher education revolve around a certain force. If the theories originate from the same cradle, they are likely to produce a seemingly divergent but essentially homogenous type of effects which might not broaden our perspectives on teacher subjectivity in relation to using technology.

Truly, educational researchers' main task is to investigate a certain educational phenomenon and develop a theory, through scientific attempts to reveal and explain somewhat 'unseen' educational experiences (Corbin & Strauss, 2015). However, it should also be the case for educational researchers to question the taken-for-granted assumptions so that theories can spawn the 'never imagined' future. It cannot be denied that previous research attempts in the field of TEL have been leading us to understand learning and teaching experiences in relation to technology integration. Nevertheless, it is worthwhile to examine to what extent those theories enable different educational subjects (i.e., actors) to freely imagine and create unique futures (i.e., innovative educational practice). In the same vein, Lynn Fendler (2012) argues that theory has been 'lurking', 'distilling' and 'reframing' (see section 2.2). She continues to call that theory can take different roles. Therefore this research aims to answer Lynn Fendler's call, suggesting that theories can 'exceed', 'generate' and 'vibrate' (see section 2.2).

There have been continuing efforts to promote specific characteristics and competencies of teachers such as being 'open' to using technology, 'fluent' in digital literacy, and 'passionate' in updating their pedagogy in the relevant literature. Nevertheless, it has been suggested that in real-life educational contexts, the promised innovation has never been near to us (see e.g. Gilbert, 1996; Laurillard, 2008; Selwyn, 2011). This mismatch between the scholarly efforts and the actual realities offers a strong reason for TEL researchers to investigate what theories are doing as a way to imagine a different way in understanding and utilising theory in TEL research, specifically in relation to teacher education.

It should be clearly noted that this paper does not dismiss the scholarly contributions in TEL research. Further, it does not reject any theories by saying they are wrong. The research does not intend to offer clinical prescriptions to cure the limited views and academic practices. Rather, what this article ultimately aims to achieve is to provide different spaces by suggesting that TEL researchers can imagine different theories. When researchers can see what they have been doing from the third perspective, we can recognise a new path which has never been taken in the field. We are not throwing an evaluative question, "what is a good theory in TEL research?" to deflect the current directions in TEL research. Instead, we intend to throw more 'forward looking' reflective questions, "what kind of theories are there?", "how are they constructed?", "what are they doing?" and "what are the effects of those theories?"

Below, the first part of the paper outlines the theoretical framework which conceptualises theory as discourse. Then,

methodological approach is demonstrated which utilises the theoretical framework in this critical literature review project. The second part addresses the questions by exploring certain types of actions of theories in a set of scholarly journal articles (N=33) concerning TEL-related teacher education. The point of interest is on the dominant but limited ways in which theory has guided research practices and knowledge construction. Specifically, we categorise what theory has been doing and provide a critical commentary on the types, actions, and effects of theory (or theories) in the context of teacher subjectivity in TEL research. We acknowledge that the insights one might gain by reading this paper will doubtless not be practical compared to the prevalent research, for example presenting a statistically proved model which predicts teachers' future behaviour in integrating technology. Nonetheless, we hope the article will be of help to other teacher educators, academics, and policymakers who share our concerns at the absence of insightful conversations about how to imagine different teacher subjectivity in TEL research.

2. Theoretical framework

Given that this paper aims to identify what theory has been doing in TEL research, it seems necessary to devise a conceptual tool which treats theory as an agent so that the actions of theory can be empirically analysed. To devise the tool, we reconceptualise theory as discourse. First, we make clear what it means by 'theory' and possible forms of 'theory' in TEL research. Second, we introduce Foucault's understanding of discourse and show how theory can be treated as discourse by comparing the forms and the characteristics of both. Lastly, Lynn Fendler's (2012) critical reflection on common actions of theory in educational research is introduced which envisions TEL researchers to critically engage with theories.

2.1 The analytics of TEL theory: Theory and Foucauldian discourse position

It is rather challenging to define the word 'theory' despite its popularity and familiarity among educational researchers. However, it is necessary to define the term as clearly as possible. It is mainly because that 'a priori concept' of theory can be avoided which could render the research process invalid and unreliable (Abend, 2008, p. 177). Paul Trowler (2012) agrees on the potential danger of reckless use of theory and he discusses how theory can be deployed for close-up research. In the mean time, the author argues that theory has six key features in social sciences (Trowler, 2012, p. 274):

- It uses a set of interconnected concepts to classify the components of a system and how they are related.
- It develops a set of systematically and logically related propositions that depict some aspects of the operation of the world.
- It provides an explanation for a range of phenomena by illuminating causal connections.
- It also provides a prediction which will reduce the uncertainty.
- It locates local social processes in wider structures.
- It guides research interventions by helping researchers to define research problems and appropriate research designs.

These features of theory can be materialised into a few forms. Firstly, this paper considers 'big', 'clear', and 'explicit' statements that appear in social research as theory (Trowler, 2012, p. 274). In other words, we consider theory as a set of statements providing an interpretation of aspects of the world and make descriptive, explanatory and predictive statements about certain social phenomena. For example, 'Marxist theory' is a social theory given that it consists of and offers 'big', 'clear' and 'explicit' statements about social systems and structures. Secondly, we include another theory which is another set of statements, not necessarily 'big' but 'clear' and 'explicit' as a theory: 'micro-theory' (Merton, 1949, cited in Trowler, 2012). If there is a theory about teachers' uses of iPad in English teaching in primary school in EFL (English as Foreign Language) context, the theory would be small but will provide a causal explanation clearly and explicitly with some related concepts. Lastly, we include 'tacit theory' which is particular, often implicit 'assumptions' affecting our ways of perceiving and making sense of a certain social phenomenon (ibid., p. 275). For instance, if a researcher studies men and women to prove an assumption saying "men are more rational than women", the proposition works as a 'tacit theory' guiding research interventions. Such a tacit theory often comes from our common-sense knowledge or dominant social discourses. In sum, theory in this research is a certain set of statements which shows the features and has one (or more) of the three forms of theory.

Having conceptualised what theory is, we turn to a theoretical tool which can be useful for the analysis of TEL theory. The theoretical tool for the analysis is drawn from Foucauldian notion of discourse; it means that theories in TEL research are considered as discourses. Foucault used the term in a flexible manner accompanying a few possible definitions and uses (Mills, 2004). In this research, we take the uses of the term; Foucault used 'discourse' in at least

three different but inter-related ways, as he explains:

Instead of gradually reducing the rather fluctuating meanings of the word ‘discourse’, I believe I have in fact added to its meanings: treating it sometimes as *the general domain of all statements*, sometimes as *an individualizable group of statements*, and sometimes as *a regulated practice that accounts for a number of statements*. (Foucault, 1972, p. 80, emphasis added)

The first definition (i.e. discourse as the general domain of all statements) has the broadest meaning, referring to all utterances being made, in any form of communication – “which have meaning and which have some effects in the real world” (Mills, 2004, p. 6). The second definition (i.e. discourse as an individualizable group of statements) refers to a more selective group of statements about a particular subject that has regulative power upon people’s thoughts and behaviours. The distinction between utterances and statements can be useful here: “statements are for [Foucault] those utterances which have some institutional force and which are thus validated by some form of authority—those utterances which for him would be classified as *in the true*” (ibid., p. 55). In this sense, among multiple discourses, the dominant one consists of authorized and sanctioned statements exerting more regulative power effects upon people, whereas other less dominant discourses may have less power effects. The third definition of discourse (i.e. a regulated practice that accounts for a number of statements) explains the rule-governed mechanism of discursive practices, in a broad sense, rather than providing a practical unit of meaning of the term itself.

Generally, discourse in this paper will mainly mean a set of statements legitimatizing certain ideas of teacher subjects and less legitimatizing of other ideas of teachers as subjects. The meaning of discourse resonates with the features and forms of theory. Both discourse and theory consist of utterances. Discourse is not truth just as theory is not; however, both concepts serve to make certain ideas come to be judged as trustworthy while others not. In other words, they are neither neutral representations of teachers as subjects nor general communications in a more linguistic sense – but ‘rather’ they both have political, regulative, and ideological force (see Coloma, 2011). In the meantime, the statements constituting dominant discourse (or theory) tend to be viewed as being common-sense (recall ‘tacit theory’) during which teachers are likely to be inscribed in a certain way as subjects of the dominant discourse. As a result, it would form a specific subjectivity which is a version of what teachers (are supposed to) do in order to fulfil one’s constructed identity with regard to technology use at this

historical juncture. The reconceptualization of theory as discourse provides a perspective in which the analytical points can be laid upon the discursive construction of theory. Further, it also enables recognition of the discursive effects of theory on teacher subjects in TEL research.

2.2 Actions of theory in educational research

Foucauldian discourse position gives us a perspective in which we can perceive theory as an agent which does something. Indeed, theory has been taking various actions in educational research (Fendler, 2012). Even though the existence of a theory is often not obvious or explicit, each theory provides different sets of values that strongly inform our choice of a research problem. In that regard, Lynn Fendler (2012) points out that theory has been ‘lurking’ in educational research. Further, she critiques that theory has played certain roles of ‘distilling’ and ‘reframing’ in educational research—despite its potential of ‘exceeding’, ‘generating’ or ‘vibrating’ educational research. Here, we will introduce each of the six actions in Fendler’s work, which inspired us to launch the analysis of theory in TEL literature.

Firstly, theory has never been absent in educational research but it is often ‘lurking’ in the academic literature by appearing in different sections such as methodology, literature review and findings as peripheral or marginal statements. The importance of explicitly articulating and discussing one’s theoretical approach is overlooked by many educational researchers, which has resulted in critical theoretical claims lurking (ibid., p. 317). Secondly, theory has been used by many educational researchers to distil “a vast and complicated array of data” (ibid., p. 317). The distillation role of theory might be the most familiar and recognisable one among researchers who see theory as a tool to make sense of (often, simplify) countless variations and complex relationships among them in any given social phenomena—that is, theory often “reduces complexity to regularity” (ibid., p. 318). In our analysis we focused on how theory has included certain variables or evidence in particular research while having excluded others. Also, we paid careful attention to how theory excludes certain evidence that can possibly provide counter-arguments and different (often opposite) interpretations of the social phenomenon. Thirdly, theory has also been reframing researchers’ understanding of (and approach to) a certain social phenomenon. That is, a new theory may enable researchers to look at the same research problem from a different angle and bring about, although rarely, paradigm shifts or revolutionary transformations in the field of the research. Our analysis examined to what extent theory has reframed researchers’ views on their focused subjects in previous TEL research.

Lynn Fendler (*ibid.*) suggests possible actions of theory in educational research, which include ‘exceeding’, ‘generating’ and ‘vibrating’. Educational theory may help us exceed our understandings to go beyond what is already known by challenging taken-for-granted assumptions and inviting alienated ideas which have been previously excluded. Theory may also generate completely new ideas and possibilities by sparking our imaginations. Finally, theory may also vibrate research communities by connecting separate entities and ideas across those communities so that educational researchers can gain a new perspective and understanding of the world. That is, beyond the traditionally defined or expected roles of theory, theory can exceed our present understandings, generate new ideas and inspirations and connect disconnected knowledge, efforts and communities. By doing so, theory ultimately liberates us from taken-for-granted assumptions and approaches to educational research.

Here, it must be mentioned that the aim of the research is not to apply what has been found by previous research. In other words, the actions of theory in educational research were considered as the conceptual springboard which enables this research to launch a micro-analysis of theory in TEL research. The purpose of this research is geared to the new adventure which aims to explore where studies in TEL research have not explored in which the findings from the previous studies might not be applicable.

3. Methodology

Having outlined the theoretical framework, we turn to methodology, demonstrating how we built the data set and advanced our theoretical framework in the process of the analysis. First, we show how the articles were retrieved from an academic database and reduced to the actual articles for the analysis step-by-step. Second, we describe how we read theory, we coded its actions and we generated our understanding. At the end of this section, we briefly discuss how the issues of validity and reliability were considered.

3.1 Forming up the data set

This project adopted a systematic scoping process when searching for literature and selecting articles for the study (Arksey & O'Malley, 2005, cited in Lee & Bligh, 2019). The set of data was collected by searching peer-reviewed journals in Scopus, the largest abstract and citation database of peer-reviewed literature (<http://www.scopus.com/>, cited in Lee & Bligh, 2019). The field we chose to type included ‘title’, ‘abstract’, and ‘keywords’ of academic papers. The following search terms were typed:

- “Technology” AND
- “Teacher education” AND
- “Training”

The search words were the result of alignment with the main research questions:

- What are teachers supposed to do to be regarded as properly trained in terms of using technology?
- How does theory in TEL literature understand this question especially in the field of Teacher Education?

The paper search was conducted in July 2019 and identified 446 papers. The two authors developed inclusion and exclusion criteria for the further filtering process. The secondary filtering process was implemented by reading abstracts of journal articles to decide whether those papers should be in the data set based on criteria. We agreed that each abstract must demonstrate the following focus:

1. a focus on technology integration in education
2. a focus on teachers’ Information Communication Technology (ICT) competencies
3. a focus on pre-service teacher
4. a focus on a specific historical period (2003-2019)

The reasons for setting such foci can be explained in accordance with the objectives of this research. We intend to find out what theory has been doing in TEL research especially in the area of teacher education (Focus 1). So, we focused on theory regarding teachers’ ICT competencies as we believe that it represents teacher subjectivity in relation to TEL research and practice (Focus 2). Given that pre-service teachers are in the process of being educated to be ‘good’ teachers, they seem to be the right subject of this research (Focus 3). Further, in a practical term, such a criterion helps us to construct a manageable data set with a clearer focus. Thus, it targets the articles published after 2003 (Focus 4). Australia’s Smart Classroom Project is globally considered as the first and most desirable case that successfully achieved its aim to incorporate ICT in schools by developing teachers’ ICT competencies between 2002 and 2014 (Korean Education Ministry, 2011). The first literature related to the project in Australia (and subsequently other similar projects) was published in 2003, which guided our decision on the time frame of the review. Setting the time line with the initiation of a globally renowned project allows us to justify the use of the global database, Scopus. The filtering process resulted in 87 articles. Lastly, we examined the sources of those 87 papers; 33 articles were confirmed

that they are from journals that demonstrate a considerable level of editorial rigour (Web of Science Group, 2019). It would be reasonable to assume theories in the final data set to satisfy scholarly expectations and legitimacy in the field of TEL.

3.2 Reading, coding and generating

We started an initial coding process with the theoretical framework presented in the previous section. A spreadsheet was created via Microsoft Excel programme to manage the data set and to gather our critical comments. In the beginning, each article was carefully read. The first author extracted a sentence or a paragraph when he identified theory while reading articles. Extracted text data was labelled based on initial codes. The nine initial codes were ‘providing causal explanations’, ‘calling related theory’, ‘categorising responses’, ‘encouraging further research’, ‘mentioning famous theory’, ‘curing pedagogically malfunctioning teachers’, ‘measuring teacher competencies’, ‘declaring assumptions as a theory’, ‘excluding the counter-evidence’. Later, to increase reliability, both authors cross-checked the analysed data.

The generated initial codes were revised and categorised by both authors with the following themes after discussions with a critical friend: ‘building’ theory, ‘medicalising’ theory and ‘expanding’ theory. They were essentially related to Paul Trowler’s (2012) features of theory as well as Lynn Fendler (2012)’s ‘lurking’, ‘distilling’, and ‘reframing’ theory to some extent. However, the concepts that we generated were not necessarily identical to those just as they suggest. This is mainly because the focus was on the discursive construction and its effects of TEL theory in general with the particular focus on teacher subjectivity. The generated themes were further specified as the analysis continued into sub-categories which came from the initial codes (e.g. citing, interacting, and excluding; examining, diagnosing, and prescribing; carving out, dictating, and marching).

Even though both authors collaborated to increase both validity and reliability, the trustworthiness of the research outcomes renders qualitative research controversial. To cope with the issue, this project adopted the ‘critical friend’ method (cf. Lincoln & Guba, 1985). While both authors analysed the texts, the generated concepts and further categorisations were presented to a critical friend (a doctoral candidate who is currently writing up her thesis on a related topic). It should be mentioned that her comments contributed to developing the research findings.

4. Results

In this section, we present the results of the analysis. Three themes that we found can be seen as follows:

1. Theory is ‘building’ its legitimacy.
2. Theory is ‘medicalising’ educational phenomenon.
3. Theory is ‘expanding’ its territory.

Themes are derived from the theoretical framework introduced in the previous section. Even though it has stated that theory does often lurk, distil, and reframe in educational research, the focus of the present study is more on identifying what theory is doing while it is lurking, distilling and reframing in TEL research. In other words, the authors aim to present discursive consequences of ‘lurking’, ‘distilling’ and ‘reframing’ as we explore what specific theories are, where they are and what they do in selected TEL literature.

The first theme introduces that theory has been reinforcing its own fortress while it has been ‘lurking’, taking various forms in TEL literature. The next theme points out that TEL research has ‘framed’ (or ‘reframed’, at some point) teachers and their teaching practices as ‘abnormal’ things (i.e., pedagogical illness) which should be medicated. The last theme argues that theory tends to expand while it is carving out its territory by generalisation and marching with the dictations appointing the future territory of TEL research. These three themes should not be approached as isolated ideas but be understood as inter-related ideas explaining and unpacking roles of theory in TEL research—under the particular regime of theory. That is, the three themes collectively recount how the regime builds TEL theory itself, governs its subjects, and expands its realm, which subsequently creates, validates, and circulates a certain version of truths.

4.1 Theory is building its legitimacy

4.1.1 Presentation of theories

Theory cannot stand alone as a single statement. It must be reinforced by supporting elements. In the data set, TEL theory—a set of statements that provides certain interpretations of particular aspects of TEL—is often accompanied by backup ideas or statements (sometimes, opposite ideas). Having been stated, the ideas interact with each other increasing legitimacy of the theory. Simultaneously, there are other statements that have not been included but excluded.

The challenges facing the practising teacher in respect of integrating new technology into their teaching are *well documented* (e.g. Norum, Grabinger, & Duffield, 1999; White, 2000). These challenges mean that even those willing to embrace change often face pressures of time and lack of resources or training that mitigate against development. Set against such challenges, it is no surprise to find that research shows that, far from leading to major shifts in pedagogical practices, rather the technology itself *is moulded to* current practice (Goodson & Mangan, 1995). (Sorensen, Twidle, Childs, & Godwin, 2007, p. 1606, emphasis added)

One of the most prominent characteristics of theory building in the selected literature is ‘citation’. It is clearly seen in the above excerpt including phrases like “well documented” and three citations. It enables writers to make their arguments stronger. For instance, the citations make a ‘big’, ‘clear’ and ‘explicit’ point that teachers face challenges as to the integration of technology and further suggest that teachers facing challenges is a common educational problem—and the authors’ argument is ‘authorised’ by “well documented” literature which is the result of interaction between the argument and the cited literature. Given that there is no other supporting evidence except these three citations, the supportive relationship between the authors’ theory in the form of argument and the backup statements looks rather clear.

What is interesting here is that the focus is moved to the next point smoothly. The authors claim that technology “is moulded to” current practice rather than it is changing current pedagogies. Again, the statement is declarative and supported by previous research. While it is unstated why technology is supposed to change status quo pedagogies and why current practices are considered not good enough, it seems evident that the authors have a tacit theory—implicit assumptions about TEL—that teachers’ current practices are problematic and so need to be changed by technology. However, many teachers’ efforts to continuously innovate their pedagogical practice are entirely excluded throughout the process of building the tacit theory. As a result, the tacit theory implies that what we have now is fundamentally ‘inferior’ and ‘feeble’ so that it should be changed.

4.1.2 Interactions between theory and backup statements

The similar rhetorical deployment of theories is significant in Tondeur, Aesaert, Prestridge and Consuegra (2018) when they introduce SQD-model (this model will be revisited in detail in the final theme). Before they introduce the model, the first backup statement is presented, arguing that

there is complexity in the process of technology integration in education. The statement is supported by two citations of previous research which, on the surface seem to well document the complexity. Once it is stated with all necessary supporting statements and citations, interactions begin among the following backup statements creating a safe space for the main theory (i.e., SQD-model) to be introduced. That is, it is implied that the technology integration process is complex (i.e., the statement is posing a problem) and therefore, TEL needs a solution to the problem. As the justification for the utilisation of the SQD-model is clearly set up, the main theory can be effectively presented as the solution to the technology-related problem whose significance has already been stressed by the second backup statement saying that there is an “extensive literature” studied the “specific strategies” as the following excerpt demonstrates:

Promoting pre-service teachers’ competencies for educational technology use in an integrated manner is a complex process that demands *specific strategies* in order to be successful (Agyei & Voogt, 2014; Goktas, Yildirim, & Yildirim, 2008). These strategies were identified through an *extensive literature* review by Tondeur et al. (2012) and conceptualized in an overarching SQD-model (Synthesis of Qualitative Evidence) which presents six effective strategies at the micro level (Fig. 1): 1) using teacher educators as role models, 2) reflecting on the role of technology in education, 3) learning how to use technology by design, 4) collaboration with peers, 5) scaffolding authentic technology experiences, and 6) continuous feedback. (Tondeur et al., 2018, pp. 32-33, emphasis added)

The main theory is positioned as effective medicine—that is, the SQD model is presented as an appropriate cure to the TEL-related illness (this point will be discussed in detail in the next theme).

In the paragraph below, the authors introduce the ‘theory of telecollaboration’. Telecollaboration means the application of online communication tools so that learners in different places can learn together. The theory aims to develop learners’ knowledge and competencies by participating in collaborative tasks and projects. It is theorised as an appropriate pedagogy to facilitate teacher training since it boosts learning outcomes including the development of critical thinking skills, the co-creation of knowledge and meaning, and reflection and transformative learning, while it ‘supports social interaction, dialogue, debate, and intercultural exchange’ (Bueno-Alastuey, Villarreal, & García Esteban, 2018, p. 370). As can be seen from the theorisation, it is worthwhile to focus on some of the authors’ language use

which seems to be largely influenced by the cited articles. The theory is stated with a large number of active positive verbs such as “promote”, “bring about”, “bridge”, “enhance” and “link”. On the other hand, some negative verbs, which can be used to describe any potential limitations of telecollaboration such as ‘delay’, ‘subtract’, ‘disconnect’, ‘weaken’ and ‘isolate’ are never mentioned or strategically excluded by the authors. Here as well, all claims made by the theory are warranted by supporting ideas and literature:

Telecollaboration was deemed as the most suitable means of *promoting* both interaction and experiential learning about technology, as virtual exchanges have been said to *bring about* added pedagogical value (O’Dowd, 2013) and *bridge* the gap between theory and practice (Dooly & Sadler, 2013). Telecollaboration tasks have been shown to *enhance* pre-service teacher techno-pedagogical development by offering opportunities to experience the affordances of technology and to *link* their knowledge about existing technological possibilities and opportunities with experiential use and integration (Dooly & Sadler, 2013). This experiential and authentic use of technologies is not possible in face-to-face contexts, and has been considered by some authors as a facilitator of ICT integration in ways that are supportive of learning (Meskill, Anthony, Hilliker-Van Strander, Tseng, & You, 2006), of increased awareness on issues related to techno-pedagogical design and implementation (Bueno-Alastuey & Kleban, 2016) and even a sine qua non condition for the future application of such tools and processes (Guichon & Hauck, 2011) ... Additionally, *experiential learning* can contribute to the development of TPACK knowledge by engaging students in ‘*cognitive apprenticeship*’ which affords them the opportunity to be creators of knowledge by way of active collaboration and reflection (Collins, Brown, & Newman, 1989; Dickey, 2007a, 2007b; Hockly, 2000; Vasileiou & Paraskeva, 2010). (Bueno-Alastuey et al., 2018, pp. 370-371, emphasis added)

In the above text, the authors list six citations and twelve names of authors. The backup citations and a large number of the listed authors are supposed to increase the credibility of their main theory and the legitimacy of its existence in the article. The authors start from general benefits of telecollaboration by summoning three other TEL researchers (i.e., O’Dowd, Dooly, Sadler). They then connect the benefits of telecollaboration to the issue of teacher education. In order to show further credibility of their benefit-claims, the authors ‘add’ more information of “experiential learning” while ‘bridging’ it to “cognitive apprenticeship”. By doing so, the authors can ‘enhance’ the trustworthiness of their theory about telecommunication by ‘linking’ it to previously

validated and more established learning theories.

4.1.3 Inclusion of oppositional theory

It is not always backup ideas that authors cite to increase the legitimacy of their main theory. Authors can include ideas and statements opposite to the main theory; in doing so, the demarcation between what is being theorised and what is not becomes more explicitly highlighted. For example, the oppositional statements about TEL can be identified in the text below:

The above results suggest that the ICT portfolio did have an effect on student teachers’ use of ICT during their school placements, with most of them going beyond the minimum requirements of using ICT four times in teaching mathematics. This contrasts with our previous experience, and to the *research findings generally* (Murphy & Greenwood, 1998; Simpson et al., 1998). Moreover, the follow-up study indicates that they continued to make use of ICT in their first year of teaching, again in contrast to studies on practising teachers (Mumtaz, 2000). It is reasonable to suppose that similar findings will be experienced across other subject areas. (O’Reilly, 2003, p. 441, emphasis added)

When O’Reilly (2003) puts his theory, claiming that the ICT portfolio has good impacts on the effective ICT use in teacher education the author draws on three pieces of previous research on the topic (i.e., Murphy & Greenwood, 1998, Simpson et al., 1998, Mumtaz, 2000). The cited research indicates that teachers’ actual use of ICT in their classroom is not directly related to their familiarity with ICT; that is, despite the familiarity, teachers do not use ICT in their daily teaching contexts. This “generally” reported “research finding” somewhat undermines the value of ICT training in teacher education and suggests there are more fundamental issues that need to be addressed to encourage teachers to use more ICT in their teaching. Regardless of the oppositional ideas, the author dismisses the need to examine the fundamental issues and contrasts the previous reports with his own findings. The author’s positive theory of the usefulness of the ICT portfolio is suggested as an effective solution to the ineffective teacher training conducted by the previous authors.

We have presented a few examples that show discursive strategies used in the selected TEL literature in order to present theories and legitimise their presentation. Theory is presented with multiple ideas and statements that support the theory by interacting with each other. Theory in TEL research often accuses teachers of their poor pedagogical

practices in which they fail to integrate technology and promotes the effective use of technology as a cure for teachers' pedagogical illness. This first theme details the basic characteristics of the theory-building process in the selected literature and the established theory becomes the basis for subsequent discursive actions in TEL research, which will be discussed in the following sections.

4.2 Theory is medicalising an educational phenomenon

What we have identified in the data set in terms of what theory is doing in TEL research is somewhat similar to a 'medical' or 'clinical' process. When it comes to 'clinical process', we mean that authors seek to examine various domains of a particular TEL phenomenon to detect possible pathological causes of the problem that they have identified. Further, we argue that theories in TEL research are mainly interested in diagnosing what is 'not normal' and 'sick' which necessarily demand an appropriate prescription—i.e., medicalisation.

4.2.1 Examination

In selected articles, we have found a few common theoretical constructs that are used to identify and define problematic aspects of teachers' practices and soul (Ball, 2003). For example, technological pedagogical content knowledge (TPACK) is a framework that is "most extensively used and accepted to explore the knowledge base needed for teaching" (Bueno-Alastuey et al., 2018, p. 369). TPACK is a relatively new knowledge domain introduced by Koehler and Mishara (2005). It adds one more layer of knowledge about technology to Shulman's (1987) construct of pedagogical content knowledge (PCK). PCK indicates that teachers are required to have knowledge about the content (i.e., knowledge of the subject) and pedagogy (i.e., knowledge of how to teach effectively) so that they can teach appropriately. Therefore, TPACK refers to intersectional knowledge of teachers required to teach the content of subject pedagogically with the use of technology.

Indeed, the TPACK framework appears in ten articles in the whole data set (i.e., Brun & Hinostroza, 2012; Bueno-Alastuey et al., 2018; Funkhouser & Mouza, 2013; Haydn, 2014; Koh, Woo, & Lim, 2013; Nguyen & Bower, 2018; Tondeur et al., 2018; Tømte et al., 2015; Scherer et al., 2017; Scherer, Tondeur, Siddiq, & Baran, 2018). Considering that our data collection process was not necessarily concerned to include the TPACK framework, the presence of ten articles studying TPACK out of thirty-three tells that the intensity of scholarly interest for the theory is substantial. Further, given that TPACK theory provides a new knowledge domain which

can be newly measured, the desire for the TEL researchers to gain information about pre-service teachers' status could be also said as considerable.

While the theory promoted by the TPACK framework examines pathological matters in regard to a lack of teachers' knowledge—a comprehensive knowledge set—other theories in the literature focus on different domains of TEL phenomena. Thus, those theories provide different diagnoses. For example, Nguyen and Bower (2018) and Tondeur et al. (2018) attempt to theorise the "technology-focused lesson design capabilities" of teachers. Nguyen and Bower (2018) not only consider relevant teacher knowledge regarding technology integration but also include teachers' thinking processes and teaching beliefs in their theorisation. Even though they recognise the TPACK framework as one conceptual and analytical lens which enables us to see the development of TEL design capabilities, they suggest 'the possibility' might be there for other aspects of learning which could be as important as TPACK (or even more). With their efforts to theorise teachers' TEL design capabilities, they intend to "develop a comprehensive understanding of the nature of novice learning design or the factors" (ibid., p. 1031). Further, the reason for their research is no doubt medical when they aim to offer 'assistive interventions' to novice teachers who are in a 'critical stage of teacher development'.

Teachers' belief is another significant domain of common diagnosis made by the TEL theories. Bahçivan et al. (2018) build a comprehensive model of pre-service teachers' technology use. The proposed model identifies various aspects of teachers' beliefs and the effects of those beliefs on their attitudes towards using instructional technologies. In the same vein, Chen (2010) studies two theoretical models regarding pre-service teachers' use of technology with a specific focus on the support of student-centred learning. Those models consist of theoretical constructs such as self-efficacy and the perceived value of technology use as well as contextual factors (i.e. access to technology, administrative & technical support, time for integrating technology). Liu (2012) also develops a multivariate model of factors influencing technology use that measures pre-service teachers' beliefs—based on the explicit theory that teachers' beliefs are predictive of their technology integration and so worthy of exploration.

Other domains that are often diagnosed as problems (or illnesses) in TEL literature include pre-service teachers' ICT use or instructional design practices (Judge & Bannon, 2007; Kuchner & Selinger, 2003; Goktas, Yildirim, & Yildirim, 2009; Nguyen & Bower, 2018). Identified causes of the problems are subsequently framed either as enablers or

barriers of teachers' technology integration (see. Boulton & Hramiak, 2014). As the specific adjectives (i.e. 'comprehensive' and 'multivariate') in the name of theoretical models suggest, it is worthwhile to mention that the points of interest of TEL theory not only seek to be omni-present across teachers' knowledge, beliefs, practices, and contexts and but also seem to still be eager to be as inclusive as possible.

4.2.2 Diagnosis and Prescription

Having secured its domain by examining its subjects (i.e., teachers) and surrounding factors (e.g., access to technology, support, curriculum time), theory can be used in defining what is normal and what is not regarding their status. Further, researchers can prescribe relevant medicine depending on the status of subjects. For example if TPACK of a teacher is below the average level, the teacher will be diagnosed as 'abnormal' which means that one should be trained properly. Likewise, the mission of TEL theory is often to define 'what the problems and the right cures are' for the identified undesirable phenomenon. In the data set, that discursive process or mechanism of diagnosis and prescription has been clearly observed. It should be noted that subjects of the examination are not limited to teachers and the domains of diagnosis are varied in TEL literature. However, most of the theories, whether they are diagnosing or prescribing, are argued as being 'comprehensive' and/or 'extensive'.

Although several studies show that teachers are among the *most skilled ICT users*, it seems that they are still *unable* to apply these skills to the way they teach (Pedro, 2009). Some feasible explanations for this paradox highlight the experiences in Initial Teacher Training (ITT) among *the most important factors*. However, a claim about the existence of a link between ITT and teaching skills with ICT needs to be supported by empirical evidence: this study aims at generating relevant information on this matter. (Brun & Hinojosa, 2014, p. 222, emphasis added)

Brun and Hinojosa (2014) study experiences in Initial Teacher Training (ITT). The reason is that teachers are "unable" to use ICT skills they have in their teaching practices. Since those 'malfunctioning' teachers should be 'functioning', the researchers focus on teachers' training curriculum to see whether it is desirable or not "among the most important factors". A tacit theory behind the estimation can be read as follows: good educational input in ITT produces well-functioning teachers. Based on the tacit theory, the writers seek to diagnose what is problematic in ITT. Here, teachers are described as if they are the pure reflection of educational input.

On the continuum, Judge and Bannon (2007) report what could be good training experiences. The paragraph below starts from a strong declaration stating that many educators resist the use of technology because of lack of training. The domain of examination is the quality and quantity of teaching training. It seems to be taken-for-granted that technology integration must happen whereas the actual reasons for the resistance of educators are not mentioned. A tacit theory can be read as follows: 'even though many educators resist, somehow sufficient training would address the problem'. In this case, the provided prescription seems to be drawn from rather naïve optimism, despite the 'well documented' articles supporting the prescription.

Cummings (1995) suggests that many educators resist the use of technology because they have not had sufficient training. To integrate technology into the daily life of the classroom, sustained, high-quality professional development for teachers is a critical ingredient (Consortium for School Networks, 2004). Researchers concur that effective technology training *takes place over time*, includes *ongoing support*, and provides *in-depth, active learning* that is *applicable to the learner* (Dyrli & Kinnaman, 1994; Munday, Windham, & Stamper, 1991; Sheingold, 1991; Siegel, 1995). This time allows teachers to build a knowledge base, reflect and make changes in practice, and gain and share expertise (Valdez, 2002). Roblyer and Erlanger (1998) support these findings as they summarize the literature saying that effective technology training must include (a) hands-on integration emphasis, (b) training over time, (c) modelling, mentoring and coaching and (d) post-training access. (Judge & Bannon, 2007, p. 289, emphasis added)

The authors of the above text start to state the theory of 'good training'. The theory is stated with the conditions of 'effective technology training' which consist of "ongoing support" and "in-depth, active learning" opportunities which should be "applicable to the learner" and "take place over time". The writers continue to detail and support their 'theory of effective training'; by doing so, they make the theory become more explicit. By introducing Roblyer and Erlanger (1998), they further posit a stronger theory that effective technology training must provide certain 'regimen'. The regimen requires 'long', 'direct', 'multiple' doses of training which also keeps tracking and reassuring whether teachers are situated in the educationally (or clinically) safe environment. It evidently implies that the whole training process should be constantly observed.

Drawing upon the 10 essential conditions identified by ISTE, we designed a multi-component model (see Fig.

1) that we reasoned would develop new teachers who are capable of infusing technology into the curriculum to enhance student learning. (Judge & Bannon, 2007, p. 289)

The main motivation of the prescription comes from a tacit theory arguing, ‘infusing technology enhances student learning’. According to the assumption that tacit theory is based on (and also reinforces), there is no justification for teachers’ resistance to technology integration given that it enhances learning and enhancing students’ learning experiences is the most important task of teachers. This logical development around the tacit theory seems to free the authors from the academic (or moral) responsibility for providing the actual reasons for teachers’ resistance; that is, such theory in TEL literature often allows researchers to dismiss teachers’ voices. It shows the example of the excluding effect of theory despite the fact that the validity of the theory itself (i.e. technology enhances student learning) is still debatable (see Selwyn, 2011).

TEL research also diagnoses teachers’ beliefs by suggesting that “traditional” and “teacher-centered” teaching beliefs are abnormal conditions. In that regard, Funkhouser and Mouza (2013) theorise pre-service teachers’ beliefs. The authors start from a strong claim about pre-service teachers’ beliefs and subsequently call for right prescriptions that can correct some teachers’ wrongly held beliefs as the following excerpt demonstrates:

Preservice teachers enter their teacher education programs with established, *deeply held* beliefs about *teacher roles*, *students*, and the *academic material* to be taught (Kagan, 1992; Niederhauser et al., 1999; Wang, 2002). ... These beliefs, largely developed during their *twelve-year “apprenticeship of observation”* (Lortie, 1975) as students, often center on *traditional, teacher-centered* classrooms (Calderhead & Robson, 1991). As a result, they do not value the role of technology in addressing important teaching and learning needs (Zhao & Frank, 2003). ... In order to persuade preservice teachers on the value of technology, we first need to investigate the images of teaching and learning that they bring to their teacher education program and design opportunities for them to recognize and reflect on those images (Kearney & Hyle, 2004). If preservice teachers themselves do not recognize and reflect on their beliefs about teaching with technology, they may perpetuate the teacher-centered methods they experienced as students (Ertmer, 2005). (Funkhouser & Mouza, 2013, p. 272, emphasis added)

The text above is a good example of presentation strategy

of theory building (i.e., citations, interactions and exclusion) as well as the process as to how TEL theory is medicalising its subjects. The first backup statement asserts that pre-service teachers have “deeply held” beliefs regarding teaching and learning of which the statement is supported by three articles giving the impression that the theory is ‘well documented’. To provide an explanation of the mechanism in relation to the belief formation process “apprenticeship of observation” theory is mentioned. Here, the theory provides the ‘authorised’ explanation regarding the process that pre-service teachers have developed their beliefs about “teacher roles”, “students” and the “academic material” to be taught for the last “twelve-years”. While the observation theory itself stays neutral in relation to “deeply held” beliefs of pre-service teachers, another backup idea of ‘deeply held’ beliefs of pre-service teachers cuts in and changes the whole statement. The latter idea ‘diagnoses’ that the “deeply held” beliefs of pre-service teachers are anchored to “traditional” and “teacher-centred” versions of education. Combined, the statement becomes an ‘authorised’ but ‘dangerously’ bold claim indicating that the ‘deeply held’ beliefs of pre-service teachers are traditional or teacher-centred and therefore problematic. It is obvious that good sides of so-called ‘deeply held’ beliefs are excluded. Further, by using the ‘conditional’ clause and stating the expected consequences mentioned in the research, the main idea intensifies its significance and effectively increases the need of investigation about necessary coping strategies.

The findings show that theory in TEL research is medicalising the extensive areas. It seeks to examine many possible domains of TEL phenomena including teachers’ capabilities that can be often examined based on their knowledge, beliefs, attitudes as well as their practices and training experiences. The findings also report that theories in TEL research are being developed and deployed to diagnose the undesirable symptoms. Based on the claims saying those symptoms might produce dangerous effects, prescriptions are being provided by some theories in order to ‘boost’ technology integration as the most reliable cure. The next section is to do with theory which becomes more prevailing and grows bigger, resulting in its dominance in TEL research.

4.3 Theory is expanding its territory

While the previous themes focus on the effects of theories in TEL research within their theoretical boundaries (i.e. inside their empirical territories), the focus of this theme is on the effects of theories outside their theoretical boundaries (i.e. ‘the movement’ of theories across their empirical territories). Here, we draw our findings heavily from our analysis of Tondeur et al.’s (2018) work. The particular

study concerns the impact of educational support provided by a training centre on the perceived ICT competencies of pre-service teachers. By proposing SQD-model (Synthesis of Qualitative Evidence) which examines the relationship between independent variables (e.g. age, gender, attitudes towards ICT) and dependent variables (i.e. ICT competencies) as a theoretical framework, the authors emphasise the effectiveness of the interventions (i.e. prescribed training) on teachers' competencies.

4.3.1 Carve

In this section, we *relate the main findings to the existing literature*. In addition, we extrapolate the limitations of the study, directions for future research and practical implications for supporting future teachers for technology integration in education. (Tondeur et al., 2018, p. 38, emphasis added)

In the first sentence in the text above, we can gain insights regarding how theory 'carves out' its territory. The writers "relate the main findings to the existing literature" which may effectively 'reinforce' their theory. That is, researchers 'relate' their research findings built around their theory (or theoretical claims) to other theories or claims that have already been authorised and proved by previous studies. It is noteworthy that the authors take the very same strategies used for building the legitimacy of their theory in the earlier part of the paper (see the first theme). Using the same strategies seems like a strategical and reasonable move given the effectiveness of those strategies for 'building' a strong theoretical claim. This inevitably involves drawing 'lines' of the territory of the theory regarding the empirical or actual educational contexts where the theory would be applicable and considered valid. Interestingly, what the researchers are doing with the strategies is that they re-mark the empirical territory of their theory (i.e. the scope of the effects of their theory) as clear and as broad as possible by reinforcing their research findings.

ICT attitudes have no impact on *pre-service teachers* competencies to design a learning environment with ICT. This is in line with the findings of van Braak, Tondeur and Valcke (2004). Similarly, they delineated two main categories in a study among inservice teachers in Flanders: a) competencies to use ICT to support their educational practice and b) competencies to develop pupils' ability to use ICT. Also in their study, attitudes towards ICT in education only influence the teachers' competencies to support pupils' ICT use. Clearly, these results highlight the importance of distinguishing between types of

competencies. (Tondeur et al., 2018, p. 38, emphasis added)

The marks of the theory are carved by the 'certainty'—not by the 'probability'. The authors argue that pre-service teachers' ICT attitudes are not directly related to their ICT design competency. The way in which the lack of a logical correlation between the two factors is explained by the authors is rather declarative. While the result was drawn from the authors' statistical analysis (a multivariate hierarchical regression analysis), the result does not indicate the 'probability' but shows only 'certainty' (Fendler, 2006). It should also be noted that the findings drawn from a 'limited' number of the participants of the study are quickly translated into the general claims and statements about 'all' pre-service teachers. Further, the theory of the relationship between the two factors becomes effectively connected to previous research results produced by van Braak, Tondeur and Valcke (2004). By doing so, the theory can be repeated by external voices contributing to gaining a higher level of objectivity and universality.

4.3.2 Dictate and March

The act of carving out a clear territory of their theory renders TEL researchers to notice where the limits of their theoretical claims are. So, it enables researchers to identify the directions for their next steps, which are logically bound by the marked territory. The authors (Tondeur et al., 2018) acknowledge two limitations that 1) the results cannot be generalised to other teacher education contexts such as in-service training and/or to other parts of the world; and that 2) the quantitative nature of their research which might not be comprehensive enough to capture a complex educational phenomenon (ibid., p. 39). Thus, the boundaries of (the power of) their theory are carefully re-iterated—that is, it is gently and rather implicitly suggested that their findings may be only valid and reliable in pre-service training contexts in Flanders. Nevertheless, their findings are presented using particular discursive strategies that imply a much broader scope of their power, which goes beyond the implicitly identified boundaries. Dictating future directions is one of the strategies.

In the focused article (Tondeur et al., 2018), there are three dictating strategies used to suggest future (or further) research and each is related to the discursive notions of 'research paradigm', 'subjects' and 'time frame'. First, the researchers call that "future studies need to undertake qualitative interpretative research" (ibid., p. 40). The writers mention that their quantitative study provides 'a basis' for future qualitative studies by showing the relatedness

of the variables (e.g., age, gender, ICT attitudes, ICT competencies, provided training). They continue to argue that other less-measurable factors (e.g. events, activities, contents, interpersonal processes) also interact with each other influencing teachers' ICT integration; therefore, there is an urgent need for the integration of a qualitative research paradigm in future research. Second, the authors suggest that teacher educators need to be included in further studies and better supported by researchers since they are the important 'subjects' that model effective ICT use and provide the relevant ICT qualifications to pre-service teachers. Lastly, the writers recommend a longitudinal study tracing ICT integration of pre-service teachers in real-life classrooms after fully entering the profession and taking the responsibility as an in-service teacher. We can identify three ambitions of the theory promoted by the authors: (1) the theory produced by 'quantitative research' seeks to be permeated in the subjective world; (2) the theory reports the new identifiable subjects; and (3) the theory attempts to prolong its longevity.

Once the territory of theory is marked and future directions are dictated, theory can be set to march further. From the beginning of the research, the authors' theory is triumphantly marching throughout their article while carving out and expanding their territory. Based on the medicalisation of a particular educational phenomenon (i.e. teachers' ICT integration), their study seeks to identify both factors and solutions for the identified educational problems.

Many studies have centred on pre-service teachers' characteristics associated with their ICT competencies, such as their *ICT attitudes* (e.g., Holland & Piper, 2016) or *"ease of use"* (e.g., Teo & Milutinovic, 2015). Nonetheless, the focus on pre-service teachers' characteristics could lead to individual blame rather than system blame when explaining ICT competencies. Research should also stress the role of training institution. Therefore, the main aim of this study was to explore the impact of pre-service teachers' background (age and gender) and ICT characteristics (e.g., attitudes towards ICT) in combination with the support they receive from their teacher training institution on their ICT competencies. ... The two outward circles in the SQD-model include the conditions necessary at the institutional level such as *technology planning and leadership, training staff, access to resources, cooperation within and between the institutions*. The two inner circles include *micro level strategies* such as using teacher educators as role models, and scaffolding authentic technology experiences. The six strategies at the micro level were examined in this study: role models;

reflection; instructional design; collaboration; authentic experience; feedback. (Tondeur et al., 2018, pp. 33-34)

While medicalising, it broadens its scope by incorporating 'the contextual considerations' (i.e. the role of training institution). The article explicitly mentions that it intends to avoid a situation where individual teachers are 'blamed' for their poor ICT competencies. On the surface, it may be perceived as an enlightening and critical approach to teacher subjectivity that expands our 'limited' understanding of teachers' ICT integration and provides deeper insights into teacher education. Or at least it sounds reasonable since it questions a commonly held tacit theory in teacher education that teachers' poor performance of the ICT integration is due to the lack of individual teachers' efforts and competencies. However, on a closer view it is not difficult to notice that the authors ultimately and contrastingly suggest that teachers should be better trained and their teaching and training practice needs to be regulated by a more rigorous discursive apparatus that is built based on a more comprehensive theory including 'the contextual considerations'. On the continuum of the assumption analysed earlier (i.e. good educational input in teacher training produces well-functioning teachers), the tacit theory has only minor changes in its theoretical/linguistic constructs: from the word 'input' to 'environment'.

In contrast to the previous approach which often blames teachers' attitudes and competencies, this new theory includes a variety of issues such as "technology planning" and "leadership", "training staff", "access to resources", "cooperation within and between the institutions" and "micro level strategies". The domain of research subject is more inclusive and multi-layered, therefore theory is getting bigger as its territory is expanding. However, the theory holds and promotes the same educational mission (i.e. technology integration should be successfully implemented by well-trained teachers) and the assumptions (i.e. good educational environment produces well-functioning teachers). Thus, the authors' seemingly critical statements above bear no positive impact on real-life teacher subjectivity—it does not challenge the unquestioned assumptions about the relationships between teachers and technology.

Once research domains are identified and examined based on the theoretical considerations, the domains become the places for the theory to march. New domains will be included in TEL research and theorised as accredited paths that TEL researchers and teacher educators can safely follow and go down while carefully designing, organising and managing teachers' teaching and training practice as an attempt to increase the quality of education. Despite the

efforts, future research will again identify similar problems, limitations and further research directions, through which the TEL theories will continue to develop and grow. Therefore, unidentified domains will be constantly found and identified domains will be theorised with more precision in TEL research. In this way, all the possible domains will be placed under the current regime of TEL theory—the endless cycle!

5. Discussion and Conclusion

With the scholarly efforts made by numerous TEL researchers, TEL theory has been building its theoretical legitimacy while successfully carving out and expanding its territory both in pedagogical and research contexts. Inside the territory, the same kind of TEL theories have been framing and medicalising educational phenomena in which teachers and their practices are being examined, diagnosed and prescribed. In this section, we intend to argue the significance of the assumptions underlying the TEL theories. As discussed in the previous section, there are *at least* four assumptions shared by dominant TEL theories, which include:

1. Integrating technology in education enhances student learning.
2. Teachers' current practices are problematic and so need to be changed by technology integration.
3. Good educational input in teacher training produces well-functioning teachers.
4. Even though many teachers resist, sufficient training would address the problem.

Those assumptions play an important role in producing a certain version of teacher subjectivity and limited possibilities for the future of education. After illustrating the potentially dangerous power of the current TEL theories, we will conclude by suggesting a possible way to rethink teacher subjectivity so that TEL research can generate not just 'new' and 'different' but also 'exceeding', 'generating' and 'vibrating' theories.

The stated assumptions above claim what is the case and what is valuable in relation to technology integration and education. The first is the most fundamental and common assumption holding the entire TEL research field—somewhat blind faith in technology. The second assumption includes explicit evaluation which undermines current practices and exalts the technology-integrated practices. So, it urges teachers to move and change. The third assumption shows our unconditional beliefs about the effectiveness of

education and training. Like a black magic box, education is supposed to produce the desired outcomes of educators and so education can be a solution to all possible problems. The last assumption represents our understanding of teachers. Given that there is no in-depth consideration about teachers and their own agency, they are often regarded as 'soul-less' beings in TEL research whose pedagogical beliefs can be developed and transformed by others' will and intention. That is, teachers are seen as responsible but subjugated actors who should integrate technology into their classrooms in order to enhance their currently undesirable practice. Thus, their resistance can neither be accepted nor considered responsible (even reasonable).

The assumptions are necessary to create a coherent link between parts of any given TEL theory including backup statements and supporting ideas (Fairclough, 2003). If it were not for these assumptions, all the theories that we identified in the selected literature would not make sense. However, at the same time, this implies that TEL theories are bounded. The assumptions render this rather violent and limited narrative which might read as follows: 'Pre-service teachers now are not good enough, they thus need to be properly educated so that they can be equipped with technology-integrating pedagogies. It does not matter whether they resist or not, they must be trained to use technology in their teaching because they are supposed to be the ones who enhance student learning'.

With this discursive conceptualisation of teacher subjectivity, we can appreciate the dominant version of 'good' teachers and desirable educational practices. Further, combined with the discussed actions of TEL theories, we can see the process of the birth, growth and the circulation of the dominant images, which may not be necessarily realistic. Nevertheless, as long as TEL researchers continue building theories, medicalising educational phenomenon, and expanding theoretical territory based on the identified assumptions, the TEL theories are not likely to open new, more diversified possibilities. It will become harder and harder to have exceeding, generating and vibrating theories in TEL.

Fendler (2012) envisions that theory in educational research which enables us to 'disrupt' those unquestioned assumptions and embrace alienated ideas to not to think in the same common or familiar ways (i.e., exceeding). By exceeding what is taken for granted, 'disruptive theory' can spark our imaginations and generate new ideas (i.e., generating). Lastly, theory can seek to connect commonly disconnected knowledge, efforts and communities by understanding them as a continuum (i.e., vibrating). We conclude by imagining

a different type of TEL theory that could be ‘exceeding’, ‘generating’ and ‘vibrating’.

We imagine a few disruptive TEL theories. ‘What if’ there is a research:

- not based on the familiar assumption of teachers (i.e., homogenous conceptualisation of teachers sharing the same pathological malfunctions), but based on the heterogeneous understanding of teachers who are all different and have their own soul as well as unique strengths;
- not based on factors or variables which reduce unique vibrations of education to subjects (e.g. teachers, leaders), contexts (e.g. training curriculum, technology access, infrastructure) and treatments (e.g. teacher trainings), but based on a set of continuums of education so that we can connect TEL knowledge, emotions, practices and communities;
- not targeting on certainty to dictate knowledge about TEL but targeting on probability to open more diverse thoughts about TEL in relation to teacher subjectivity.

It should be clearly mentioned again that we do not argue that technology use does not help to increase the quality of education. It is not our intention to provide the actual disruptive theory. Also, we do not mean that teachers should not use technology or should not learn how to use technology. Rather, we intend to critique the TEL research having taken-for-granted certain assumptions, ideas and theories without questioning the regulative effects upon teachers as well as TEL research. Based on the results of this critical literature review project, we argue that TEL research shows only a limited form of the present and the future among many possible forms of TEL. On this point, therefore, we want to recommend TEL researchers be more thoughtful of what kind of teacher subjectivity is being created in relation to their taken-for-granted assumptions. Given that there have been nation-wide education reform policies globally, which are uncritically driven by the dominating images of good teachers and the innovative education circling around technology integration, their aftermath would be a question worthy of further investigation.

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