

Lee, S. & Lee, K. (2023). Smart teachers in smart schools in a smart city: Teachers as adaptive agents of educational technology reforms. *Learning, Media and Technology*.

## **Smart teachers in smart schools in a smart city: Teachers as adaptive agents of educational technology reforms**

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This study raises a critical question: ‘what does it mean to be smart teachers in the era of technology?’. To provide a concrete and comprehensive answer to the question, the authors use a notion of discourse and analyse multiple discourses revolving around SMART education, an educational technology reform initiative in South Korea launched in 2011. This article critically examines the significance of SMART education as dominant discourse by reviewing its stated meanings, importance, and influence on the formation of teachers’ roles and subjectivities in relevant education policy texts. The results show that SMART education is conceptualised as ‘panacea’ that can practically solve all kinds of educational problems, which leaves no choice for teachers but to accept and execute SMART education. The authors also analyse teachers’ perceptions and practices by drawing on interviews conducted in a smart city in South Korea, where the SMART education policy was first enacted. Based on the analysis, it is argued that smart teachers are supposed to be ‘adaptive’ to survive by proving themselves as ‘compatible’ with technology-driven educational and social changes. This article concludes that it is necessary to think of different, more diverse versions of smart (or good) teachers.

### **1. Introduction**

The COVID-19 pandemic has undeniably disrupted the education sector: face-to-face teaching activities have been completely suspended in many countries, one billion students globally have not been able to attend school, and many have engaged with digital formats of pedagogical interactions instead (Lee et al., 2022; Tlili et al., 2021). While the world seems to be recovering from the pandemic, there is an increasing prevalence of Artificial Intelligence (AI) technologies such as ChatGPT (Bozkurt et al., 2023). The emergence of AI has provided new challenges for today’s educators, asking them to leverage their potential (e.g., personalised learning opportunities) and simultaneously address the subsequent threats (e.g., academic dishonesty and plagiarism; digital inequalities) (see Ducar & Schoket, 2018; Lee & Fanguy, 2022; Zawack-Richer et al., 2019). In these circumstances, our dependence on digital technologies and their importance in education reform have never been higher. However, this is not the first time to see this desperate effort to incorporate technology into

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educational practice. In the past decade, there has been increasing recognition of (and enthusiasm for) the significant role digital technologies can play in improving educational quality.

Technology-driven education reform movements aiming to integrate digital technologies into classrooms to innovate education have been observed in many countries since the early 2010s. A few examples of such initiatives can be listed here: ‘SMART education’ in South Korea, the FATIH project in Turkey (e.g., Milla et al., 2019), Education For a New Era (EFNE) in Qatar (e.g., Romanowski et al., 2013), and ‘Futureschools@Singapore’ in Singapore (e.g., Tay et al., 2014). They shared a vision that technology-based infrastructure would innovate education systems often described as outdated and inefficient. These initiatives have attracted astronomical budgets from their governments and gathered scholarly attention (Milla et al., 2019; Romanowski et al., 2013, Tay et al., 2014).

In response to the growing popularity of educational technology reforms, some researchers have attempted to raise critical awareness of the unintended but significant impact of such reform efforts on shaping teachers’ roles and subjectivities in a particular way. For instance, Alderton and Pratt (2021) argue that digital assessment tools turn teachers’ roles into ‘fillers’ who are supposed to work on pupils’ under-achieving areas. Player-Koro et al. (2018) suggest that teachers are often encouraged to be ‘entrepreneurs’ who welcome, accept, and promote educational technology (i.e., Ed-tech) displayed in trade shows or exhibitions. Schubert and Wurf (2014) demonstrate that teachers are asked to be ‘carers’ who take heavy responsibility for protecting pupils from the risks of using digital technologies. It seems clear that various digital technology-driven educational reforms and changes have significantly impacted the formation of contemporary teacher subjectivities while (re-)inscribing teachers’ roles and responsibilities to better serve the newly evolving educational systems. Therefore, the present authors also critically analyse how a specific educational technology reform policy, creating ‘SMART Education’ initiatives in South Korea, has influenced teachers’ subjectivity and subsequently changed their perspectives and practices.

SMART education policy, envisioning an innovative education system, was ambitiously launched in 2011 with a massive public fund of around 60 million pounds. While the term ‘smart’ has increasingly appeared in a range of policy discourses since the early 2000s, it has notably popularised in many educational technology discourses, as seen from the examples of smart schools, smart classrooms, and smart devices (Crook, 2016). Based on careful observation of various usages of the term smart, the author provides a useful categorisation in which he distinguishes ‘adaptive smart’ from ‘regulative smart’. It can be called the former if someone can adapt to external changes or threats in a receptive manner. On the other hand, if someone can detect external changes and generate changes in the environment to its capacity, it would be ‘regulative smart’, which is two-sided, more reciprocal than the former. Employing the categorisation, the present paper aims to identify and conceptualise how smart teachers are inscribed in a particular educational technology policy context and discuss its implications on their subjectivities and practices—whether adaptive or regulative smart.

In the South Korean education reform policy, ‘SMART’ is not just a simple adjective. It is an acronym for ‘Self-directed’, ‘Motivated’, ‘Adaptive’, ‘Resource-free’, and ‘Technology-embedded’ (MoEST, 2011). This nationwide initiative is particularly worthwhile to investigate as it was selectively implemented in a bounded geographical area in South Korea called *Sejong city* with full support from the Korean government. The city is

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even called a ‘Smart city’. Since its launch in 2011, all schools in *Sejong city* have newly been built with cutting-edge infrastructure (e.g., Wi-Fi network, personal digital devices, interactive whiteboards). These so-called smart schools in the smart city have successfully attracted a large number of foreigners staying in Korea, including government officials, politicians, journalists, and teachers from different countries (e.g., Germany, Myanmar, Sweden, UAE, USA). Schools have welcomed many policymakers and educators from around the world whose visits aimed to benchmark SMART education initiatives (Cho, 2013; Choi, 2014, 2016).

Besides the advanced infrastructure and the international popularity of smart schools in *Sejong city*, the significance of the reform policy can also be demonstrated in the steadfast administrative support from the Korean government and public institutions and the existence of teacher training programmes specialised in SMART education. Subsequently, many Korean teachers have enthusiastically adopted and performed SMART education (Jung & Lee, 2014; Kim et al., 2018; Seol & Son, 2012), which will be documented in the findings section. Given the tangible outcome and materialised impact of the policy, the present authors believe it is a timely effort to critically examine the power of SMART education policy at this historical juncture where we witness rapid advancement and uptake of digital technologies in many educational contexts worldwide. Therefore, we have conducted a discourse analysis of relevant policy documents (i.e., a government policy paper and national research reports) and 18 interview transcripts collected through in-depth conversations with multiple stakeholders such as teachers, teacher educators, school managers and a regional supervisor in the smart city.

By doing so, this research ultimately aims to understand the discursive power of technology-driven education reform policy on teacher subjectivities in the current educational context and further problematise often taken-for-granted assumptions of teachers’ responsibilities with technology use in education. It should be emphasised that it is not our intention to simply devalue educational technology reform efforts nor dismiss the potentially positive impact of such efforts. Instead, the study findings will shed light on the need to develop a nuanced understanding of the educational consequences of those efforts.

## **2. Theoretical Framework**

This study utilises Michel Foucault’s theoretical tools to explore how the subjectivity of smart teachers is constructed by the technology-driven education reform policy and how power is involved in the discursive formation of teacher subjectivity in significant but subtle ways. As Foucault emphasises, the notion of power in this study is relational and process-oriented rather than deterministic and product-oriented. It is important to note that power is not simply prohibiting or controlling forces that can be seen in the state’s sovereignty or the law (see Foucault, 1978, p. 92). Foucault claims that power comes from everywhere and produces new relationships and rules rather than blindly oppressing particular groups or prohibiting specific actions (Foucault, 1978; 1991). Under this view, power (relationships) can be observed in every possible domain of our lives, playing significant roles in shaping people’s identities while creating rules, norms, and knowledge. For example, in very mundane situations, like when we choose clothes, various forms of power (e.g., cultural norms, socio-economic status, personal preferences) would come into play in enabling us to choose the ‘right’ clothes for a

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specific place and time (Lynch, 2011).

In this sense, Foucault criticises the common view of power as a thing owned by a handful of powerful figures who have complete control over other people (see Foucault, 1978). Power is in action when it analyses its object part by part and normalises what can be perceived as abnormal (and vice versa in Ball, 2013). Here, surveillance and knowledge about the object play key roles in governing the object (Fendler, 2010). The best example of disciplinary power might be the panopticon, where people constantly being observed by an observer finally internalise rules and eventually act based on the rules even without the gaze (Hoffman, 2011). This is an example of ‘governmentality’, which takes the concept of power as ‘guidance’ in the field of possibilities (Fendler, 2010; Lemke, 2010). Instead of depending on forcing people to do something in a coercive manner, the state utilises many instruments of power to manage people’s conduct and their perceptions by opening and shaping the field of possibilities (Fendler, 2010; Lemke, 2010; Thompson, 2003).

To empirically explore this rather abstract domain (i.e., power) with concrete and tangible evidence, Foucault suggests a critical examination of discourse. Foucault approaches discourse “sometimes as the general domain of all statements or an individualisable group of statements and a regulated practice that accounts for a number of statements” (Foucault, 1972, p. 80). That is, discourse can be defined as a set of statements which prioritise, normalise, and problematise certain ideas of a particular subject; and can be analysed by analysing texts (cf. Mills, 2004). If discourses are reflected images of power, subjects are the effects of power (Fendler, 2010). They are governed by or govern themselves to conform to norms and rules imprinted in discourses (Ball & Olmedo, 2013; Fendler, 2010). This idea of discourse-and-subject relationship enables researchers to collect relevant textual data and examine how power works by looking into how specific subjects are described within relationships of multiple discourses in the texts (Lee, 2020).

Therefore, previous educational researchers have explored the discursive formation of teacher subjectivity in a particular educational context as a means to trace how dominant educational discourses exert and circulate disciplinary power upon teachers (cf. Ball, 2003; Lee & Lee, 2020; Mooney Simmie & Moles, 2020). Through such exploration, unseen discursive patterns have been identified, developing a deeper understanding of how teachers are controlled or enabled to be subject to particular subjectivities and surrounding discourses at a historical juncture (Ball & Olmedo, 2013; Foucault, 1982). Before concluding this section, it is noteworthy that Foucault does not deny the subject’s agency (cf. Lee, 2020). Even though teachers cannot be entirely free from dominant discourses and their discursive influences, they can always freely come across many different possibilities by self-fashioning themselves while engaging with other (alternative) discourses (Thompson, 2003). Therefore, it is an urgent task to critically unpack the construction of smart teacher subjectivity within the current SMART education policy discourse. The liberation of the teacher subjectivities can only be possible when the subjected teachers can see the limit of possibilities (norms and rules) posed by the SMART education policy and, ultimately, liberate themselves from such limitations.

### **3. Research methods**

This research closely examines what is termed ‘SMART education discourses’ to identify how a particular

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teacher subjectivity of smart teachers is constructed in the South Korean context and to detect subtle but significant discursive power circulated by the target discourses. SMART education discourses in this study have been defined as ‘sets of statements which prioritise the pedagogical application of SMART education to innovate the Korean education system’ (see section 2). By employing Foucault’s schematic four-part framework (Clarke, 2009; Fendler, 2010), this study interrogates a set of requirements for (responsibilities of) teachers stated in different texts and reveals a particular teacher subjectivity that would fit in SMART education discourses. The four parts that constitute the framework are 1) substance, 2) mode of subjectification, 3) regimen, and 4) telos. Substance is related to a part of subjectivity that is supposed to be changed. Mode of subjectification has to do with the reasons for the change. Regimen refers to self-practices meaning actual practices that subjects do to change themselves. Lastly, telos is the endpoint of the identity works. Among these four-axis, the present paper focuses on ‘substance’ and ‘regimen’ that can be translated into the following two specific research questions:

- 1) what part of the teacher subject is supposed to be changed to fit in SMART education? (substance)
- 2) what should teachers do to fit into the new, desirable SMART education system? (regimen)

To answer the first question, the authors have paid attention to what is claimed as the rationales behind SMART education and competencies for teachers to demonstrate in policy texts. Regarding the second question, the authors have captured various educational practices teachers are engaged with to demonstrate and develop such competencies by interviewing teachers and other educational stakeholders (N = 18).

### **3.1. Data collection**

There are three sets of textual data collected for the present study. One seminal and comprehensive policy document was collected for in-depth text analysis: “SMART education Implementation Strategies” (MoEST, 2011). The 37-page-long government document defines SMART education, sets up key tasks with a large budget allocation (about 1.5 billion pounds), and describes a range of educational contexts where SMART education is expected to be implemented (see section 4.1 for details). The document also indicates different tasks to build an effective SMART educational environment and infrastructure, which include: the development and application of digital textbooks, activation of online teaching and assessment, the enhancement of accessibility and safety of educational environments, the establishment of cloud service (and other learning management systems) to enact SMART education. Since its publication in 2011, the policy paper, as a blueprint, has played a significant role in leading Korean educational technology reform initiatives and guiding teachers’ and educators’ practices (e.g., Kwon & Chun, 2013). Thus, we believe that this document can serve the study as a useful starting point to examine the power of discourses of SMART education; in reality, it also acts as “sites of struggles and negotiations over the construction of competing and contradictory identities” of teachers (Thomas, 2005, p.4).

Second, three research reports focusing on teachers’ roles in enacting SMART education were selected and included as data sources for this study: each piece respectively deals with providing tips and a self-assessment checklist for effective instructional practices in SMART education (KERIS, 2012), designing training programmes for teacher competence for SMART education (KERIS, 2013), and developing an online

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assessment tool to evaluate the teacher competence (KERIS, 2014). The earliest published paper has 77 pages, the second document has 169 pages, and the last one has 75 pages. These reports were found in the online research database of Korea Education and Research Information Service (KERIS), a national education research institute funded by the government. KERIS has played a significant role in implementing the SMART education policy in school settings, as initially set by the aforementioned policy document (MoEST, 2011). For example, KERIS has produced and distributed relevant knowledge and guidance for teachers and other educational stakeholders to facilitate the enactment of SMART education and developed and circulated ICT tools (e.g., digital textbooks) to establish SMART educational environments. Thus, we believe that the selected three reports are an evident place where we can identify the discursive power of SMART education discourses.

Third, 18 semi-structured interviews with one regional supervisor, five teacher educators, two school managers and ten in-service teachers practising SMART education in *Sejong city*. The participants were recruited through a combination of purposive and snowball sampling strategies (Creswell, 2014). The first author contacted and invited a regional supervisor in the Office of Education of *Sejong city* to participate in the study as an interview participant and a research partner. The supervisor enthusiastically agreed to support the study and shared the contacts of five teacher educators working in different schools across the city. All five teacher educators agreed to participate in a one-hour in-person interview and suggested several teachers and school managers working with them at the same school at the time of the study. The average teaching experience for each group was 4.5 years (10 teachers), 9 years (5 teacher educators), and 30 years (2 school managers). All participants were informed (and agreed) that their interviews would be recorded and used for research purposes (i.e., scholarly publications and presentations). Each semi-structured interview was structured based on Foucault's schematic four-part framework (Clarke, 2009; Fendler, 2010) and lasted about 1 hour (see Appendix 1).

It should be mentioned that it was rather challenging to invite older teachers in their 50s or 60s. Yoonha (school manager of School A) informed us that, due to the technology-intensive nature of the educational environment, younger teachers tend to prefer working in *Sejong city*; in fact, more than half of teachers in the city have less than five years of teaching career. In addition, Hansol (teacher of school B) confirmed that although schools recruited teachers from all ages and all over the country, many experienced teachers were neither keen to migrate to this new city nor interested in learning new skills and knowledge required for using technology. The compulsory teacher training for SMART education was also seen additional burden. This recruitment outcome provided the authors with good insight into general teacher perception of SMART education, which was further discussed and unpacked during the interview. All interview recordings were transcribed, and 18 transcripts were treated as textual data. As the transcripts document the actual perceptions and practices of participants about SMART education, the authors could identify how discursive power works in subtle but significant ways in teachers' everyday lives. Further, close and critical reading of the interview scripts has validated the analytic findings drawn from other textual data.

### **3.2. Data analysis**

Power comes from everywhere and exercises its influence not only on knowledge, rules, and norms but also on "language at use" in various communicative situations (Tight, 2019, p. 164). Given that the text is the main medium of communication (i.e., production and circulation of particular discourses), linguistic analysis of the

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text is necessary for the present study. Other researchers have previously developed useful tools to linguistically analyse texts. Critical Discourse Analysis (CDA) is a complex of wide-ranging methods for critical social science research that attempts to understand how different human subjectivities are shaped, influenced, and constrained by institutional social structures by describing the textual features (Hanrahan, 2006). Based on a belief that texts construct or position certain subjects, CDA evolves with a clear purpose to theorise the development of discourses and change social lives by recognising the power of discourses on social subjects (Gee & Handford, 2013; Power, 2007; Thomas, 2005). Among many CDA frameworks, the present authors follow Fairclough's linguistic approach to analysing texts and discourses.

Fairclough's linguistic analysis is closely aligned with the Foucauldian theoretical framework of this study, providing a workable method to appreciate subtle but profound alterations in language use (Fendler, 2006). Fairclough (2003) suggests 12 points for textual investigations, which include: social events (which event is being talked about?); genre (what types of the genre are involved in the text?); assumption (what is the assumption?); modality (how strong is the author's comment?); discourses (what discourses are drawn upon in the text and what do they do in whole in the texts?) (see more, p.191-194). Thus, to dissect the linguistic features of SMART education discourses, we looked into those 12 important venues while analysing the set of collected texts (i.e. a policy document, three research reports, 18 interview transcripts). For instance, when teachers' digital competences were mentioned as one of their professional responsibilities, the current authors scrutinised what elements are included (or excluded) as teachers' digital competences, what are the semantic relations between sentences in policy texts, and what would be the discursive effects (see section 4.1). Each type of textual data was first analysed independently. The findings from each were later cross-compared with others to capture more detailed movements of discursive power by examining how it manifests in different textual genres. Such cross-comparison has provided a comprehensive overview of SMART education discourses spread across Korean society (beyond *Sejong city*).

This study has followed the ethical guidelines set by the authors' university Code of Practice. The University's Research Ethics Committees granted the research ethics approval; all participants provided informed consent before participating in the study. The confidentiality and anonymity of the participants were secured by using pseudonyms (both their names and institutions). We have also decided not to state the precise time of the interview to protect the identity of the regional supervisor and school managers. This decision was particularly critical since there was only one regional supervisor who was in charge of SMART education in the city. We willingly acknowledge that our views must have been influenced by the very power we intend to critique. Thus, we tried to clearly state assumptions when we developed our arguments. The findings were also reviewed by established scholars in teacher education and Foucauldian educational critiques.

#### **4. Findings**

This section will report the constructed subjectivity of (smart) teachers in two aspects: the part teachers are expected to change (i.e., substance) and the actions teachers take to change themselves (i.e., regimen). Concerning the substance of smart teacher subjectivity, external changes that call for a new teacher belief

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system will be first discussed (4.1); a comprehensive set of knowledge and skills required to become smart teachers (i.e., teacher competence) will be examined (4.2). About regimen, it will be shown how teachers' self-practices are manifested in teaching training (4.3) and SMART instruction (4.4). The analytic findings, elaborated by pointing out the linguistic features of selected statements in the textual data, will also shed light on the very subtle but significant discursive formulation which renders teachers adaptive smart or regulative smart in relation to external changes (cf. Crook, 2016).

#### **4.1. External changes and the new substance of smart teachers**

Teachers are supposed to have teacher competence for SMART education (TCS) as their substance. It suggests that teachers adapt to the external environment by re-writing their belief systems and gaining new knowledge and skills. In the present paper, a belief system refers to a hierarchically connected system of attitudes and values, often reflecting tacit or unconsciously held assumptions (Kagan, 1992; Rokeach, 1968). The suggested belief system in the policy document (MoEST, 2011) consists of three inter-related statements as follows:

- Society is rapidly changing.
- The current education is problematic.
- Educational change (reform) is necessary: SMART education is a panacea

##### 4.1.1. Society is rapidly changing.

The first statement is evidenced by environmental changes mentioned in the first few pages of the government policy paper. It sets out four headings that describe various social events (MoEST, 2011, p.1-3):

- The continuous development of the digital convergence environment
- The expansion of the market in the content convergence education
- The acceleration towards creative learning society with information communication technology (ICT)
- New social demands emerging from rapid socio-economic changes

Several linguistic features (or discursive strategies) are observed in the formation of such a statement. First, 'nominalisation', the conversion of a verb into a noun-like word, is distinctive throughout this document (Fairclough, 2003). It is a linguistic feature of generalising particular (sets of) events and situations—a common discursive strategy in governmental discourses (ibid., p. 144). The discursive intention is evident that the stated social events, despite their lack of specificity or actual examples, create a generalised view of the current social status, calling for urgent (re-)actions. Second, when focusing on semantics, the stated changes in various social sectors are either 'continuous' or 'new', referred to as 'the expansion' or 'the acceleration'. The discursive effect of these word choices suggests that social changes are positioned as actual: either new or continuous (expanding or accelerating).

Other linguistic features (e.g., listing and citing big numbers) serve as subsequent discursive strategies to make the stated social changes' truths' that are (and will be) valid now (and in the near future). For example, the policy document lists official statistical data of previous government reports on technology usage in general society and draws on various social events while oscillating between facts and predictions. As shown in Figure 1, popular digital technology platforms (Wikipedia, Facebook, and YouTube) are listed as virtual channels

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where knowledge is publicly shared and produced, enabling human collaboration and maximising productivity and creativity in society. The trustworthiness of this statement is strengthened by evidence, as shown in Figure 1.

- Wikipedia, Facebook, YouTube, Twitter, 네이버 지식iN, 싸이월드 등
- 하루에 5천만 트윗(Twitter), 1일 20억회 영상 감상, 1분에 24시간 영상 분량 등록(YouTube)

- Wikipedia, Facebook, YouTube, Twitter, Naver KnowledgeiN, Cyworld, etc.
- Fifty million tweets daily (Twitter), 2 billion views on videos daily, 24-hour-long video uploads per minute (YouTube).

**Figure 1. an example of discursive strategies: listing, citing big numbers**

It is crucial to identify both the stated and unstated elements of discourse to understand the process of normalisation of particular views on SMART education. Indeed, there is no discussion about whether those massive numbers can authenticate the identified digital platforms as the site of knowledge production and the cradle of knowledge innovation. Instead, the document continues to provide other sets of statistical data. With the data from different government departments and institutions (e.g., Ministry of Education, Ministry of the Interior and Safety, Ministry of Knowledge Economy), the document shows various aspects of Korean society: an improved capacity to search and apply relevant information, a growing education market, and increased usage of smartphones and the Internet. For example, on average, people access the Internet 5.4 days a week, and 46.3 Percent of the Korean population uses the Internet daily. It is predicted that there will be more than 20 million smartphone users at the end of 2011; 80 Percent of citizens in *Seoul*, the capital city, will use smart devices in 2015. As Fairclough (2003) points out, the linguistic slippage between facts and predictions creates discursive effects of making stated social changes real and a possible future scenario as a here-and-now matter. The arguably credible data sources and big numbers create considerable discursive synergy to validate the constructed truths; the stated social changes attain the position as truths about society.

#### 4.1.2. The current education is problematic.

After constructing a discursive reality about the rapid social changes, the policy document highlights a series of ‘problems’ of the current education system. The problems include ‘teaching by rote education’, ‘slow-changing classrooms’, ‘polarisation of education opportunity and information access’, and ‘inconvenience of consumers’. An interesting linguistic feature here is that such drawbacks are directly and constantly contrasted with the positive aspects of the current education system, arguably achieved by social advancements and the government’s previous education reform efforts. Figure 2, for instance, demonstrates that the autonomy of schools has been strengthened, and the range of administrative choices has been expanded. On the other hand, the latter part of the same sentence (i.e., the noun phrase) immediately criticises the slow changes having been made in classroom instructional practice.

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- (다양화된 교육환경, 교실혁명으로 가는 길) 학교의 자율성이 강화되고 선택의 폭이 확대된 것에 비해, 교실현장의 수업은 더디게 변화

◦ (Diversified educational environment, the path to classroom revolution) Compared to the strengthened autonomy of schools and the expanded range of administrative choices, everyday classroom practices are changing slowly

Figure 2. The contrast between the positives and negatives of the current education system

Likewise, technological advancements in educational environments (e.g., excellent ICT ability of pupils and the expansion of educational informatisation and opportunities) are directly linked with a lack of technological adoption in classrooms, which is more or less assumed to be a fault of teachers. Subsequently, the same document attempts to construct a new teacher belief system based on the assumption that teachers are a source of the problem and simultaneously of the potential change. The repeated claims like that in the SMART education policy, therefore, problematise the current education system that does not cope with the rapidly changing society as failing to provide quality education to students. The document makes the teacher change necessary by constructing and juxtaposing ‘tech-savvy’ student subjects ready for the new changes and ‘slow-moving’ teacher subjects.

#### 4.1.3. Educational reform is necessary: SMART education is a panacea

Before introducing the solution (i.e., SMART education), the document offers the direction for the change by articulating the requirements of the new education paradigm (MoEST, 2011, p. 3-4). The fundamental part of the new paradigm is being adaptable to recent social changes, as discussed above. Accordingly, specific educational changes are stated as follows: implementing better teaching and learning practices in classrooms; maximising consumer experience; including active use of smart technologies; keeping learners motivated while maintaining their high academic performance; meeting diverse learner needs; and providing equal access to educational opportunities regardless of learners’ social class. Again, the policy text employs similar discursive strategies (i.e., bombarding facts and predictions relying on the authority of big numbers or renowned institutions’ data) to shut off any potential resistances and doubts about the upcoming solution (or its feasibility).

Having established the incompatible status quo of the current education and the demanding requirements of the new education paradigm, the next section of the policy document naturally or painlessly lands on the need for a mighty solution: SMART education. The last part of the new teacher belief system is about accepting SMART education as a ‘panacea’—teachers’ enactment of SMART education (i.e., teaching and instruction) is presented as the ultimate cure for all educational problems previously stated in the document. SMART education performs miraculous wonders, at least in textual reality. SMART education is defined (MoEST, 2011, p. 5) as:

[A]n intelligent and tailored learning system including educational environment, contents, methods and assessments, which is the driving force in innovating the education system for enhancing the 21st-century learner competences (emphasis from the original text).

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As the above excerpt indicates, SMART education is defined as a complete system that promises to bring educational innovation and enhance learners' competences for the 21st century. More specifically, the policy document argues that implementing SMART education will address a range of problems such as 'teacher-centred education (e.g., cramming or banking education)', 'inefficiency in educational information system', and 'educational inequality among students from different socio-economic classes'. Details about the constitution of SMART education will be discussed in the following section, with teacher competence required for its successful implementation.

#### **4.2. The essence of the new substance: adaptability**

TCS comprises the encompassing domain of knowledge, skills and attitude (see Table 1). However, it all comes down to one-sided 'adaptability' for accepting the best remedy to cure the problematic education: SMART education. SMART is an acronym for the five characteristics of SMART education (see Figure 3). Concerning 'S' (i.e., Self-directed), teachers need to facilitate student learning, enabling them to produce knowledge by effectively interacting with online evaluation systems. As for 'M' (i.e., Motivated), teachers need to motivate learners by supporting them in reorganising knowledge through experiential learning and creative problem-solving, followed by personalised learning assessment. Regarding 'A' (i.e., Adaptive), schools (or classrooms) should be a space not for knowledge transfer but for supporting personalised and flexible learning altered towards individual students' needs and levels. About 'R' (i.e., Resource Free), teachers need to help students access and use open resources made available by public and private institutions and individuals; and further, participate in collaborative learning opportunities mediated by social networking. Lastly, with 'T' (i.e., Technology Embedded), educational environments need to optimise new ICT, ensuring learner choice in their learning methods (and learning time-space)—all of the above promises can be realised only in such environments.

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### 3. 인재대국으로 가는 길 : 스마트교육

- 스마트교육은 21세기 학습자 역량 강화를 위한 **지능형 맞춤형 학습 체계**로 교육환경, 교육내용, 교육방법 및 평가 등 교육체제를 혁신하는 동력
- S Self-directed (자기주도적)**
- **(지식생산자)** 지식 수용자에서 지식의 주요 생산자로 학생의 역할 변화, 교사는 지식 전달자에서 학습의 조력자(멘토)로 변화
  - **(지능화)** 온라인 성취도 진단 및 처방을 통해 스스로 학습하는 체계
- M Motivated (흥미)**
- **(체험 중심)** 정형화된 교과 지식 중심에서 체험을 기반으로 지식을 재구성할 수 있는 교수-학습 방법 강조
  - **(문제해결 중심)** 창의적 문제해결과 과정 중심의 개별화된 평가 지향
- A Adaptive (수준과 적성)**
- **(유연화)** 교육체제의 유연성이 강화되고 개인의 선호 및 미래의 직업과 연계된 맞춤형 학습 구현
  - **(개별화)** 학교가 지식을 대량으로 전달하는 장소에서 수준과 적성에 맞는 개별화된 학습을 지원하는 장소로 진화
- R Resource Free (풍부한 자료)**
- **(오픈마켓)** 클라우드 교육서비스를 기반으로 공공기관, 민간 및 개인이 개발한 풍부한 콘텐츠를 교육에 자유롭게 활용
  - **(소셜네트워킹)** 집단지성, 소셜러닝 등을 활용한 국내외 학습자원의 공동 활용과 협력학습 확대
- T Technology Embedded (정보기술 활용)**
- **(개방화)** 정보기술을 통해 언제 어디서나 원하는 학습을 할 수 있고, 수업 방식이 다양해져 학습 선택권이 최대한 보장되는 교육환경

### 3. The Way to Great Talent: SMART Education

SMART education is an intelligent and tailored learning system, including educational environment, content, method and assessment, which is the driving force in innovating the education system for enhancing 21<sup>st</sup>-century learner competences.

#### S Self-directed

- **(Knowledge Producer)** Changing the role of students from knowledge recipients to main knowledge producers
- **(Intellification)** Learning by oneself through interacting with an online evaluation system of achievement diagnosis and prescription

#### M Motivated

- **(Experience-oriented)** Emphasising teaching-learning methods for reconstructing formal subject knowledge through learner experiences
- **(Problem-solving-oriented)** Pursuing personalised problem-solving and process-oriented evaluation

#### A Adaptive

- **(Flexification)** Strengthening the flexibility of the educational system to provide customised learning for individual preferences and future jobs
- **(Personalisation)** Transiting schools from a space for delivering knowledge to a space for supporting personalised learning tailored to individual levels and aptitudes

#### R Resource Free

- **(Open market)** Using free content developed by public and private institutions and individuals based on cloud education services
- **(Social networking)** Expanding (internal-)national use of learning resources and collaborative learning via collective intelligence and social learning

#### T Technology Embedded

- **(Openness)** Opening up the educational environment that ensures the right to choose when, where, and how to learn (as much as possible) by diversifying instructional approaches and utilising information technology

Figure 3. A captured image of the page defining and illustrating SMART education (with English translation)

In this rather ambitious discursive arrangement, it would be almost impossible for individual teachers to reject SMART education. Instead, many would wonder what roles and responsibilities they must undertake to realise such an ideal education system in their classrooms (or schools). The policy document itself ends without elaborating specific expectations towards teachers; however, the conversation smoothly continues in follow-up research reports published by KERIS. In one of the reports analysed in this study, *Smart Education Teacher Competence and Training Program Development for Smart Education* (KERIS, 2013), TCS is defined as follows:

Necessary characteristics for teachers who conduct effective education to promote core competences in the 21st century and to innovate education for future education (p. 1)

As a comprehensive framework (or a complete list), TCS integrates teachers' knowledge, skills and attitude required to enact SMART education; the framework consists of 13 sub-competences with 61 measurable performance indicators. Similar to the comprehensive definition of SMART education, encompassing a broad range of educational subjects, practices, and conditions, the TCS framework covers multiple areas, as shown in Table 1.

Categories	13 sub-competences of TCS
Basic competences	Creative problem-solving ability, Social ability, Flexibility, Technology literacy, Ethical awareness, Passion

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Practical competences	Understanding future education, Subject matter expertise, Building positive relationships with learners, Instructional design and development, Improving learning affordance, Evaluation and reflection, Building collaborative relationships with external community
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**Table 1. Sub-competence of TCS**

The sub-competences are divided into two categories: basic competences and practical competences. Basic competences refer to “personal attributes that serve as the basis for smart education practice” (KERIS, 2013, p. 1) and practical competences are defined as “specific educational tasks and activities related to the implementation of SMART education” (ibid., p. 2). The essence of TCS, adaptability, can be identified in both categories when an indicator related to SMART education is listed together with somewhat traditional characteristics of good teachers (Gudmundsdottir & Saabar, 1991). Most notably, flexibility, one of the basic competences, is defined as “the ability to actively embrace the diversity in society and make it feasible (beneficial) for the common good” (ibid., p.2). It is about ‘embracing’ differences in the name of ‘the common good’. While it is not clear what the common good means, there are four performance indicators concerning flexibility (ibid., p. 2, emphasis added):

- Understand new changes and associated challenges in various roles, situations, and schedules; and adaptively respond to them.
- Accept events and situations that are uncertain and unfixed (easily changeable); and effectively perform in them.
- Understand and accept various cultures, perspectives, and beliefs; and harmoniously accommodate them to increase their feasibility.
- Understand the characteristics of digital culture (associated with the use of the Internet and smart devices); and voluntarily join in the [smart] culture.

Flexibility in smart education is exclusively about ‘adaptation’ to external changes (cf. one-sided adaptability in Crooks, 2016). The above indicators repeat ‘adaptively’ and ‘accept’, highlighting the understanding and acceptance of ‘changes’, ‘events’, and ‘cultures’. Although there are active verbs such as ‘perform’, ‘accommodate’, and ‘join’, they are instrumental and supplement actions to embrace changes and adapt to the new environments. According to Crook (2016) ’s categorisation, the performance indicators direct a one-sided relationship between teachers and the environment, lacking reciprocity. Particularly interesting is the fourth indicator. Without its specific emphasis on digital culture, it would be hard to perceive flexibility as the basic competence of TCS. Indeed, flexibility has been regarded as one of the (rather transcendent) characteristics of good teachers for many years(e.g., Gu & Day, 2007; Gudmundsdottir & Saabar, 1991; Hargreaves, 2005, Le Cornu, 2009). Nevertheless, the fourth indicator makes a unique distinction about TCS; smart teachers need to accept digital culture to be seen as flexible in the digital era. Thus, the effective use of other media (e.g., newspapers, books, television) and understanding the associated non-digital media cultures are not good enough.

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In the practical competence domain, the same discursive pattern shows up. Building a positive relationship with learners is defined as “the ability to form a consensus based on positive communication with learners” (KERIS, 2013, p.3). There are six performance indicators under this sub-competence as follows:

- Express the positive expectations of learners’ potential
- Respect learners’ behaviours and perspectives
- Develop care for and interest in learners; and actively express them to learners
- Identify learners’ needs and situations; and appropriately provide guidance
- Identify learners’ culture and learning behaviour; and appropriately provide support
- Utilise smart tools to build close and positive teacher-learner relationships (p. 3)

Despite the strong emphasis on the learners’ self-directedness and their role as “main producers of knowledge” in the original smart learning definition (MoEST, 2011), the students are primarily conceptualised as “recipients” in the TCS discussions (MoEST, 2011, p. 5). In this positive relationship, students are rather passively expected, respected, and supported, and their needs, situations, and cultures must be noticed and identified by teachers. On the other hand, there is no particular concern about teachers’ situations, needs, and cultures—no particular respect and support towards teachers. The simple formula indicates that teachers need to adapt to learners. However, teachers are left alone in this one-sided relationship with smart devices. The use of smart tools is considered essential to building such relationships, which reconceptualise TCS as something distinctive to the smart (or digital era)—dismissing the value of more traditional communication and relationship-building strategies. In conclusion, the essence of the new substance of smart teachers is reduced to teacher adaptability to new educational environments and students; both are limitedly represented as digital.

#### **4.3. Regimen in the smart city: taking ubiquitous chances for developing TCS**

Our analysis of the interview transcripts suggests that teachers in the smart city have consistently responded to the force of particular ‘gravity’ and built up a unique regimen. We have carefully chosen the notion of gravity, as it is not necessarily direct control or explicit pressure in a negative sense. It is a more natural and prevailing force that shapes a strong field of power and possibilities of teacher behaviours in a more positive and productive sense. Thus, teachers in *Sejong city* are always encouraged and enabled to develop their TCS regardless of time and space. It means that teacher training and professional development activities occur ubiquitously, both inside and outside schools (at home), on weekdays, weekends, and holidays—day and night. Reasonably, smart schools are the most obvious places for smart teachers’ professional development. They play a significant role as training facilities.

**Interviewer:** Do you think the environment motivates you to do SMART education?

**Yuna:** Yes, since it is equipped from an environmental point of view and our school

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provides support such as teacher training programmes... they let us take Software education (i.e., computing education) [...] and trainings for using applications necessary for enabling SMART education and utilising smart devices.

**Interviewer:** Who does the trainings?

**Yuna:** There are *many talented teachers* in our school, like Chanwoo and Jiyoung. They have provided *many training programmes*. (emphasis added)

The interview excerpt above indicates that Yuna (4 years of teaching experience) is notably positive about her school environment, which she mainly refers to her school's technology-related infrastructure. Her positive attitude towards SMART education is also supported by having many "talented teachers" colleagues willing to help and train her and other teachers (i.e., teacher educators: Chanwoo, Jiyoung). In such an environment, teachers' curiosity about SMART education can readily be translated into an actual effort to access relevant training opportunities available onsite or just next door. Another teacher, Hoon, working at the same school as Yuna, also remarks:

**Hoon:** The most recent impressive training was the one held in our school. There was a training in our school taught by Jiyoung, and it was about Google and a few Microsoft programmes. [...] The school offered the programme and accepted the participant teachers. Teachers had to apply for it.

**Interviewer:** How many teachers did apply [to the recent training programme]?

**Hoon:** About thirty teachers... teachers also from other schools in the city. [...] Teachers from the other schools came to this school. It lasted several days.

**Interviewer:** Several days... over the weekends?

**Hoon:** Yes.

Like Hoon, many teachers in the smart city seem to participate in training programmes offered by individual schools over the weekends. When asked about training that occurred over the weekend, Hoon calmly says "Yes" without any additional comments. He does not seem to mind spending his weekends attending specialised SMART education training. To him, it was just the most "impressive" training. It can also be assumed that one of the talented teachers, Jiyoung, too, dedicated her weekends to training her colleagues including some from neighbouring schools.

Schools are not the only place where teachers can access training programmes. Professional development opportunities seem to exist across the city and the nation. The Office of Education in *Sejong city* also organises teacher training programmes and manages communities of teacher educators. Universities in the region and national educational research institutes (e.g., KERIS) also provide teacher training courses and instructional guidance for SMART education to teachers. In the private sector, IT companies (e.g., Facebook, Microsoft) often offer instructional support and technological tools for SMART education while managing teacher communities.

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**Jiyoung:** Yes, there is a community of innovative educators supported by Microsoft called ‘MIEE’. There are nationwide teacher communities on Facebook, and there are some offline activities in those communities, and I search trainings and *take them a lot without a break* while doing self-directed activities such as completing the tasks of a SMART education leading teacher. (emphasis added)

Jiyoung (20 years of teaching experience) was described as “a talented teacher with passion who does not stay in the same place” (Hoon). As the excerpt suggests, she consistently searches and takes part in different professional development activities to improve her TCS. Despite the extremely positive recognition of her high level of TCS from her colleagues, Hoon and Yuna, she does not seem to believe she is talented; she continuously finds herself lacking in skills and knowledge as society and technology rapidly change. She clearly takes strong responsibility for improving the current educational system to better serve her students, as demonstrated by her dedication to the weekend teacher training activities. In fact, her interview transcript has a range of statements that well-fit into dominant discourses of SMART education (i.e., a new teacher belief system discussed above), including comments like “our kids are skilful at 21st-century digitalisation, but we [teachers] are not” and “in 19th-century schools, 20th-century teachers are teaching 21st-century students”. Her motivation to become a smart(er) teacher is effectively supported by the broader educational and social systems that offer her various training opportunities and strong communities.

A teacher educator, Joseph (4 years of teaching experience), also shows a considerable level of enthusiasm for and dedication to enacting SMART education, similar to Jiyoung:

**Joseph:** In my case, my personal life and professional life are greatly integrated. Since my wife is also a teacher, my wife and I talk about school a lot after work, even though some teachers don’t talk about school at home. Conversation works since I’m interested in [SMART education], and my wife also majored in computer education. So, we keep talking about [SMART education], and such an everyday routine itself is part of my professional development process. Particularly, I think I have done a lot of [TCS] trainings by myself. You know, I don’t own a tablet PC or a Virtual Reality device. Since school has those devices, I simply bring them home and try out this and that. Though it can be seen that I’m playing with the device installing this and that, [it is also training] as I can use them [with my students] only after I try them out first.

While schools and other educational institutions provide formal training programmes at a group level, teachers’ “home” can also be a focal TCS training place where ongoing professional development activities occur at an individual level. At home, teachers spontaneously and continuously develop themselves at any time (outside working hours). As the above excerpts indicate, Joseph, as a teacher educator, teaches himself in his private life to be better in his professional life. To Joseph, there are always new things to learn (or “try-out”) to provide SMART education to his students. His enthusiasm towards SMART education is also well-supported by his surroundings, enabling him to continuously engage in the SMART education conversation (with his wife) and TCS self-training (using school devices).

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Based on the interview results, it seems safe to conclude that many teachers in the smart city have fully internalised their roles and responsibilities normalised by the SMART education discourses, striving to become smart teachers who effectively perform SMART teaching to improve student learning. Given that teacher training for TCS (and access to technological knowledge and tools) is made ubiquitously available to all motivated teachers in *Sejong city*, both online and offline, it could be rather difficult for teachers to blame a lack of training, support, and infrastructure—the most commonly identified reasons for teachers not to use technology for teaching (Seol & Son, 2012; Won, 2015)—for their lack of engagement with SMART education.

#### 4.4. Regimen in smart classrooms: selective SMART education performances

Considering the ubiquity of professional development opportunities, it should not sound absurd to say that there is intensive and extensive use of SMART instruction in schools in *Sejong city*. However, the regimen of smart teachers in their classrooms highlights that not all smart city teachers are enthusiastic about implementing SMART education.

**Yoonha:** [some teachers] think like this. “No way, it’s possible to teach students just as fine without using those ICT devices.” Even though they think like that, they use such things when there is an open class, after all... They can’t help but do it in open class. To be honest, it would not be an exaggeration to say that all teachers’ lessons are SMART education in open classes...

A deputy headteacher, Yoonha (27 years of teaching experience), shares what happens during open classes. Open classes refer to the special classroom practices that invite multiple stakeholders (e.g., parents, peer teachers, school officials, and other external educators) to join and observe the classroom practices—how actual teachers and learning take place in the concerned classroom. It is stated that some teachers, including more experienced teachers, basically have a psychological distance from SMART education. As the above excerpt states, some teachers hold (maintain) an old teacher belief that they can teach without using ICT devices “just as fine”. However, what is striking to notice is that even those teachers who do not believe in the necessity of SMART education occasionally perform SMART instruction, especially when their teaching is open to other teachers and parents. According to Yoonha’s assessment as a school manager, those non-smart teachers “cannot help but” utilise smart devices and technologies in their open classes. Jiwon (3 years of teaching experience) is one of those teachers performing SMART instruction only for spectators:

**Jiwon:** Obviously, to certain teachers who use it well and who are experienced, SMART education would give students [quality educational] experience by using SMART education in [an effective] way, but *normally*, I guess there is almost no one who performs SMART education in such a way even though the equipment is prepared. I would say *about five percent?* I also sort of want to do it, but I found it difficult... (emphasis added)

Jiwon, working at the same school as Yoonha, thinks most teachers in her technologically smart school do not effectively use SMART education. Even during open classes, when she would use some smart devices, she does

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not believe that simply performing SMART instruction does not mean that such performance is effective. Such comments give a somewhat contrary narrative to one of the enthusiastic teachers in the previous section. While Jiwon agrees with the potential benefits of SMART education for today's students—she seems to accept the new teacher belief system in a literal sense, at least—she does not perform SMART instruction during her normal classes. Jiwon reflects that she “found SMART education difficult” despite well-established infrastructure (Wi-Fi, smart devices, and interactive whiteboard); that is, it can be said that she does not have TCS, or she needs to develop TCS to be able to implement SMART education more frequently. Nevertheless, an important question still remains unanswered: why do teachers perform SMART education in open classes?

**Paul:** In most cases, the biggest motivation in implementing SMART education would be having ‘open classes’. Including myself, I guess most cases would be to show a lesson to parents. [...] I can show some differences compared to what parents used to know. By taking SMART education, I can assure parents that their children will be better in the 21st century.

**Yoonha:** Old teachers think that there are certain people who recognise teachers who don't use such things are left behind in the era [of digital technology].

Paul (6 years of teacher experience) explains his own motivation to perform SMART instruction during open classes: to ensure parents that their children are well-prepared for the 21st century. In his text, the dominance of SMART education discourses (i.e., the new teacher belief system) is more explicitly noticeable than in Jiwon's text above. No matter how deeply they have internalised such discourses themselves, Yoonha's comment suggests that many of these occasionally performing teachers tend to believe in the dominance of SMART education discourse (or, more broadly, technology-driven education reform discourses). That is, they are conscious of the negative judgement of “certain people” (e.g., visiting parents in open-class settings) on them not being smart teachers, just as prisoners discipline themselves in the presence of ‘hidden’ surveillance of prison officers in the panopticon. In this sense, performing SMART instruction becomes a means to avoid being blamed as unfit. Yoonha's comment also highlights a rather problematic way of constructing a subjectivity of “old teachers” being “left behind” in relation to SMART education. It is noticeable that it is old teachers themselves who think other people may think they are left behind. We have double-checked if there are any explicit rules or regulations that force teachers to use SMART education:

**Interviewer:** [...] Do you or other head teachers order them to do SMART education in open class?

**Yoonha:** No way, we don't do that. I think it's probably because that teachers look for something to show others in an open class.

As Yoonha states, no one forces teachers to perform SMART instruction in their normal (and even open) classes. However, there is undoubtedly subtle but strong discursive power closely related to the formation of smart (or less smart) teacher subjectivities, which enable most teachers in Sejong city voluntarily, to some limited extent, to use SMART education.

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## 5. Discussion: Dangers of unavoidable SMART education discourses

In the previous section, the constructed subjectivity of (smart) teachers in SMART education discourses was illuminated in two aspects: the part teachers are expected to change (i.e., substance) and the actions teachers take to change themselves (i.e., regimen). Here, the significance of the findings will be discussed in light of the limitations and dangers of what we have taken for granted about educational technology and technology-driven education reform initiatives—discerning techno-solutionism discourses embedded in SMART education discourses. This discussion will lead to the critical claim that it is important to devise different versions of smart teachers who can fashion themselves based on their own ethics. However, it should be acknowledged that newly devised versions of smart (or good) teachers would include some elements of adaptive smart, given its ubiquity in the discussions of SMART education. The point should not be on banning adaptive smart in the process of self-fashioning but on encouraging and enabling teachers to interact with their surroundings as freely as possible. As one of the fruitful places to begin, we would advise teachers and all the other stakeholders to consider regulative smart (cf. Crook, 2016).

The so-called ‘new’ teacher belief system constitutes the backbone of SMART education discourses, which include an array of bold statements about society and the education systems. As reported earlier, the official documents about SMART education promote a belief system that can be encapsulated in three statements: 1) Society is rapidly changing, 2) The current education is problematic, and 3) Educational change (reform) is necessary. Put simply, SMART education is a panacea (MoEST, 2011, p. 5). A fundamental assumption penetrating the statements is that *there is a right version of learning and teaching depending on the social environment*. Scholars have previously identified such flow of logic as the representation of techno-solutionism (cf. Teräs et al., 2020; Williamson, 2020). Techno-solutionism discourse has long existed in various sectors of society, including education, for at least a few decades (Johnstone, 2017; Marellie et al., 2022). It is rooted in the belief that technology is the most effective tool for solving social, cultural, and political problems (Morozov, 2011; Johnstone, 2017). Somewhat ironic and circular logic is commonly observed in the discourse: the cause of complex human problems in modern society is largely technological change, and (perhaps, but) those problems can be solved by technological change itself. Non-technology, or old, solutions are ineffective (or not effective enough) to solve the given problems. Subsequently, only technically competent people are deemed to be effective problem solvers.

The SMART education discourses also see technology both *as* a fundamental cause for the rapid social changes, posing complex problems to society and human lives and *as* the ultimate solution to solve those problems. Mitigating educational problems in a new technology-driven society via old (or outdated) educational performance is, thus, considered ineffective. In this context, SMART education embracing technological solutions is ‘the way’ to solve political, economic, and educational problems: “it is the way to a great talent-abundant country” (MoEST, 2011, p. 5). However, a point of irony here is that technology itself does not crawl into the classrooms; someone (obviously, a teacher) needs to bring technology into classrooms and make it work to solve problems. In this problem-solving scenario, the discursive position of teachers seems rather contradictory: on the one hand, they are passive and submissive users of technology, but on the other hand, they

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are responsible for solving problems by using technology. This irony or partiality in the teacher-technology relationship in SMART education discourse brings potential dangers to teacher subjectivity by granting only responsibility and a sense of duty but no autonomy or a sense of freedom. Teachers become some adaptive smart devices to adjust classrooms to external changes—just like smart thermometers make buildings react adequately to outside weather conditions.

This receptive nature of adjustive smartness seems to prevail in the new teacher belief system, which could lead to teachers' willing acceptance of their restricted authority and positionality in their own classrooms. This kind of substance of smart teachers can dismiss the unique circumstances of each school and classroom and marginalise teachers' own ethical and pedagogical beliefs, removing those critical factors away from the equation of innovative education (Marellie et al., 2022; Tessema, 2007). As technology users responsible for (solving) problems in the current education systems, teachers can be left with no choice but to accept SMART education. As illustrated by Yoonha in the previous section, teachers would conceal their preferred ways of teaching because traditional teaching methods (e.g., using a non-smart whiteboard, explaining concepts without power-point slides) are, to put radically, thought to fail their students in the 21<sup>st</sup>-century society. In this circumstance, individual teachers without TCS (despite their belief in the effectiveness of their non-smart instruction) are concerned about others having a dismissive view of them and their teaching. Consequently, teachers develop a unique self-practices (i.e., regimen) that they perform SMART education in a selective and *fabricated* manner, usually when it is seen by an audience (Ball, 2003).

In opposition to the exclusive focus on technology, a lost sense of teacher autonomy in SMART education discourses is likely to stop teachers from developing their TCS in terms of regulative sub-competences (e.g., ethics, passion, and evaluation and reflection skills). In other words, teachers may be too busy acquiring adaptive sub-competences (e.g., technology literacy, creative problem-solving skills, and understanding of future education) to have space for reflecting and acting on ethical dilemmas that arise from contradictory values embedded in SMART education (Wallace, 2019). For instance, how should a smart teacher deal with the multiple 'new' types of inequality in the SMART classroom and support underachieving students in the technology-rich learning environment? How should a smart teacher genuinely treat students as partners who co-produce knowledge when they need a lot of teacher support to achieve the learning goals? How should a smart teacher navigate the tension between a growing diversity among students and increasing pressure to meet each student customer's needs? SMART education discourses do not encompass the complexity of classroom problems; nevertheless, the urgent imperative for SMART education seems to distract teachers from meaningfully and critically engaging with the limitations of SMART education.

Unfortunately, without critical questioning of teacher subjectivity and teacher-student relationships promoted by SMART education discourses, smart teachers may unintentionally contribute to the neoliberal trends in current educational systems that treat students as consumers and reduce the function of education to produce employable graduates in the capitalist economy (Teräs et al., 2020). School curricula will be translated into a set of skills (e.g., 21<sup>st</sup>-century skills) that students need to acquire to enter the market-driven society, and teachers become a simple (replaceable) component of this human manufacturing business (Pischetola, 2021). We call this problematic teacher subjectivity 'an updatable software' in the technology-driven education reform

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initiative, striving to consistently update oneself as some of smart teachers in this study have enthusiastically taken training “a lot without a break” anytime and anywhere—at school, at home, on weekdays, on weekends, and day and night. Metaphorically, their souls and flesh are replaced by a set of codes; and the aesthetic values in human relationships are no longer sought.

## 6. Conclusion

This article aimed to problematise how teacher subjectivity is constructed in SMART education, a technology-driven education reform initiative in South Korea. By drawing on Foucault’s conceptualisation of power, the authors have critically analysed a set of textual data, including a policy document, national research reports, and interview transcripts. The findings show that an arguably new teacher belief system is installed on which a comprehensive set of knowledge, skills and attitudes is set out as teacher competence required to effectively enact SMART education (TCS). Subsequently, in *Sejong* city, a government-selected city to implement and test the SMART education policy, technologically-equipped schools (i.e., smart schools) have been established. Many technologically-able teachers (i.e., smart teachers) have been allocated to those schools to lead the reform initiative, and a range of teacher training opportunities and support have been made available almost ubiquitously. Despite the ubiquity of training opportunities (and some enthusiastic teachers’ active uptake), most teachers seem to lack TCS and maintain their non-smart instructional practices. However, ironically, they still selectively perform SMART instruction when they are being observed by others; and they seem to accept and, to a certain degree, internalise the norms and responsibilities set by the SMART education discourses.

The findings illuminate a few dangers in the discursive formation of smart teacher subjectivity, an outcome of SMART education discourses. While at an abstract level of the comprehensive SMART education policy, SMART education is framed as a panacea for all social and educational problems; in reality, its ambitious aim has been reduced to a simple mission of using educational technology. In this context, teachers have assumed a strong responsibility not for their educational outcomes in a holistic sense but for the immediate tasks of bringing technology into classrooms, often aimlessly. Adaptive smart teachers equipped with the new teacher belief system largely influenced by techno-solutionism can lose their teacher autonomy to become critical and creative educators responsible for leading educational changes. Where there is no choice but to take the only option (i.e., technology), the potential to innovate and improve educational practices and relationships can be diminished rather than flourished.

In the Foucauldian sense, this article hopefully opens up a new discursive space where educators and other stakeholders can find tensions, contradictions, and dangers in dominant educational discourses (i.e., the seamless articulations of knowledge, norms, and regulations) and relevant and restricted human (teacher) subjectivities. In this space, readers should be enabled to rethink what it means to be a good teacher in the era of technology, where teachers have been asked to respond to the calls to become ‘fillers’, ‘entrepreneurs’ and ‘carers’ (Alderton & Pratt, 2021; Player-Koro et al., 2018; Schubert & Wurf, 2014). It is particularly crucial to open up such an alternative space given the sudden, unprepared, and unreflective changes brought about during the recent COVID-19 pandemic (Lee et al., 2022). Furthermore, finding alternative spaces will be more

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appropriate where AI is already being introduced in the public education domain to incorporate AI as the future of education (Bozkurt et al., 2023, Korean Ministry of Education, 2021, Zawack-Richer et al., 2019). This time and again, similar claims about the current education systems being outdated and incompatible with the rapidly changing society, calling for technology-driven educational reforms worldwide, are repeated worldwide.

However, we should not forget that student and teacher experiences during the pandemic were complicated and multi-faceted, needing careful further examination (Lee et al., 2022; Lee & Fanguy, 2022), just as this paper demonstrated with smart teachers' unique substance and regimen.

Thus, it seems to be a timely moment to re-direct our attention to another type of smartness (cf. Crook, 2016). Like adaptive smart, regulative smart can cope with the adjustments brought by external sources; however, unlike adaptive smart, it can also regulate the external environment. We argue this gives some useful inspiration in imagining alternative versions of smartness or SMART education. Although power is everywhere and no one can be entirely detached (and free) from the power of dominant discourses (Foucault, 1978), there are always multiple discourses competing with each other in any given society; thus, Foucault (1978) concludes that there is power, there is resistance. We suggest that teachers take "a beautiful risk of education" (Biesta, 2013, p. 1) and be as free as possible in seeking what suits them and their classroom. Rather than passively accepting their subjectivity as adaptive agents in educational technology reforms, they can bravely engage with marginalised discourses in society and the current educational system, creating and performing different versions of smart teachers.

The authors acknowledge that there are several limitations to this study. First, the reported subjectivity could have been further discussed with views from different angles. This means that other analytical questions could have been added, such as 'for what reasons should teachers change themselves?' and 'what could be the ultimate form of smart teachers?'. By having these two other axes of subjectivity (i.e., mode of subjectification, telos), teachers' responsibilities might have been more detailed, and the findings altogether could have outlined the constructed subjectivity in different ways. While the authors believe that the findings and discussion in the previous sections would alert the dangers of SMART education discourses, we hope to find a chance to continue the analysis of SMART education discourses. Second, the sources of texts could have been more extensive. For instance, interview transcripts of students and parents might have shown insightful ideas about smart teachers, which could be different from teachers' voices and official texts. This could be another research agenda that the authors hope to trigger scholarly attention in this field. Lastly, data could have been bolstered by drawing on different analytical methods. Since the textual data was examined manually, the authors might have omitted important patterns that can be identified by quantitative analysis. In this regard, a corpus-based Critical Discourse Analysis could be promising when it comes to illuminating grammatical and semantical tendencies in the texts.

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## Appendix 1. Interview Guide

These are two paragraphs in the box. One is an excerpt from a policy paper from a government policy paper and a news article. Please read the texts.

- 1) How do you remember SMART education back in time such as in 2012, 2013, 2014?
- 2) How do you think about the definition of SMART education made by the ministry?
- 3) How do you think about the claims made in the article by the teachers? Do you agree or disagree and why do you think so?

SMART education is the 21<sup>st</sup> century education paradigm which excavates and develops students' talents by innovating the education system such as educational contents, methods, assessment, environments utilizing Information Communication Technology and network resources efficiently in school education based on ICT to make all students global leaders. -2011 The ministry of Education, Science and Technology department

Mr. Kim pointed out the 'collective intelligence' as the biggest effect of SMART education. "since it is possible to communicate between teacher and student, student and student in real time within the smart class, all students can take part in the lesson by taking certain individual roles. Thanks to this, a child who cannot even present his idea in the ordinary class can speak out one's opinion as many as the child wants." Mr. Cho mentioned that "after SMART education was introduced, the school site became more diverse." "For example, the map application 'Distance View' feature allows students to experience something similar to what students would find on-site when we have historical contents in social class. In science classes, we can experience some dangerous experiments indirectly by watching videos. Smart education is an effective motivator for both students and teachers."

Changwon, 2012, News

### [For teachers]

**Please tell me about your experience in relation to SMART education.**

- 1) Have you tried to implement SMART education?
- 2) What were the results? How do you think about them?
- 3) If you have any difficulties what were they?
- 4) How many times have you attempted to develop your ability in technology use on your own? And what were they?
- 5) Why did you make that decisions?
- 6) What were your expectations about the courses?
- 7) Do you plan to take part in teacher training courses in the future?
- 8) Why is that?
- 9) What types of teacher training course do you prefer?
- 10) (For example: a course that provides you with materials that you can use it directly or a course mainly aiming at developing your understanding about SMART education which based on theory)
- 11) Why? Is it related to time poverty, multiple tasks or more important or urgent issues?
- 12) What do you think is the motivation of your practices or your decisions?
- 13) Why do you think you have the motivation?

### [For teacher educators]

**Please Tell me how you think to these questions.**

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- 1) Would you tell me how you became a teacher educator?
- 2) What are the experiences as a teacher educator that you want to share (e.g. valuable moments, difficulties)?
- 3) What have you been doing to develop your technology utilisation abilities and why?
- 4) What are the things that you hope for teachers when they take training courses?

**[For school managers]**

**Please Tell me how you think to these questions.**

- 1) How do you enact SMART education in this school?
- 2) How do you support teachers in terms of SMART education?
- 3) What are your observations in relation to SMART education?

**[For a regional supervisor]**

**Please tell me about your experience in relation to SMART education.**

- 1) What is the general trend of SMART education these days?
- 2) What do you think is the main point of the policy coming from the government?
- 3) How do you support teachers in terms of SMART education?
- 4) What are the main considerations when you design and enact TPD course in relation to technology use?
- 5) What do you think teachers need more with regard to the design of future trainings courses?
- 6) What do you think the differences between the teacher trainers and teachers? (their knowledge, passion, willingness)
- 7) What do you see among principals of the schools towards SMART education in terms of attitudes?

**[Common questions]**

**Please Tell me how you think to these questions.**

- 1) Considering your experience, what is SMART education to you?
- 2) Why do teachers need to use technology in teaching and learning? (external reasons/ internal reasons)
- 3) In which way do you think that teachers have to be prepared for the education in the twenty-first century?
- 4) How would you be prepared to be a 'good teacher' for the future?