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The integration of ICT in educational process in IB education—A comparative case study

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Abstract

This study aims to gain a deep understanding of international baccalaureate (IB) primary years programme (PYP) teachers' perceptions about the use of information and communication technology (ICT) in IB PYP classes. Moreover, it seeks to critically identify the teachers' barriers and needs in order to integrate ICT into teaching and learning. Following a qualitative comparative case study research design, semi-structured interviews were conducted with IB PYP teachers and coordinators in Sweden and Greece. Critical theory, critical pedagogy and critical theory of technology (CTT) were used as the theoretical framework for analysing teachers' perceptions. From a critical point of view, the study reveals that deskilling of teachers, intensification of teachers' work, low school's financial budget, parents' financial burden, commodification and privatisation of IB education are the fundamental factors that negatively intervene in teachers' work in both schools and perpetuate the status quo of teaching and learning processes through integration of ICT.

Keywords: International baccalaureate (IB), international and comparative education (ICE), integration of ICT, critical pedagogy, critical theory of technology (CTT).

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1. Introduction

Up to 20 years now, several empirical studies have focused on the factors that encourage and facilitate primary school teachers to use information and communication technology (ICT) in the school environment. In addition, it is a very common practice that these empirical studies also examine and identify the factors that prevent the integration of ICT in teaching and learning processes. The factors that complicate the use and finally the integration of ICT in schools are usually called barriers or obstacles and are followed by teachers' needs, which contribute their efforts to more successful integration of ICT in educational process.

However, the problematic situation of these studies lies in the fact of their positivist interpretations of their findings and their solutions on the integration of ICT in education. Nevertheless, the present study departs from the argument that 'assumption that the classical consideration of the educational process as a neutral process, antiseptically isolated from the concepts of politics and their ideologies, power, history and social context can no longer be accepted with conviction' (Γούναρη & Γρόλλιος, 2010). Aronowitz & Giroux (1985) define ideology within education as 'a way of thinking about the world that refers to the production and representation of values, ideas and beliefs that members of a society accept as natural and common sense. More specifically, ideology refers to the production of concern and meaning'.

The interpretation of the problematic implementation and integration of ICT in education is often identified as a result of the expected trajectory of educational reforms, which by its nature has the aspects of 'gradual', 'slowly evolving' or 'gradual adaptation'. Thus, the proposals and discourses are regulated towards: a) accelerating the reform processes, whereas consist of increasing expenditure and investments for digital equipment, b) intensive in-service teacher's training and c) the development of educational software and digital educational material (Cuban, 2001; Eurydice, 2004; Kozma, 2003; OECD, 2001; OECD, 2005).

However, it can be claimed that the interpretations of 'slow development' and 'slow revolution', as well as the proposed solutions in order to cope with the issue of integration of ICT in educational process, are disorienting regarding to general crucial schooling crisis, which effects to the use of ICT in education. This happens due to disregarding the fact that the use of ICT cannot be autonomous and identified in isolation from the wider social, economic, cultural and educational context in which it is applied (Apple, 1998; Bromley, 1998). Consequently, both interpretations and solutions are based on low decision-making.

The process of integrating ICT into teaching and learning is a complex practice which may involves a number of obstacles/difficulties. These difficulties are known as 'barriers' (Schoepp, 2005). Different studies have classified the barriers and teachers' needs into several categories. Research have shown that barriers are: (a) lack of confidence and the teachers' restraint on ICT knowledge and skills, which cause stress and 'fear' in their efforts to use ICT in schools; (b) lack of competence, which is directly related to lack of teacher's confidence; (c) lack of access to resources, which discourages teachers from the integration of ICT in the primary education; (d) lack of experts on ICT in education and ICT coordinators in schools; (e) teachers' beliefs about teaching and learning mostly negative attitudes and resistance to change; (f) limited project-related experience; (g) difficulties to re-organise innovative practices involving digital technology; (h) teachers' unwillingness to change their teaching practices; (i) the exclusion of ICT from the curriculum; (j) teachers' fear of change; (k) lack of support from school administration; (l) insufficient financing of teacher professional development on ICT in teaching and (m) lack of time, which are obstacles affecting on the integration of ICT in primary classrooms because of teachers' workload and long-hour schooling schedules. On the other hand, the teachers need the below terms and conditions in their efforts to use or/and integrate ICT in educational process: (a) more digital resources including software and hardware; (b) effective professional development; (c) sufficient time and technical support; (d) ICT skills and pedagogical training on integration of ICT in teaching and learning; there is insufficient pace of in-service training

programmes for primary teachers toward integration of ICT into teaching and learning; (e) educational scenarios with implementation of digital technology for all school subjects and (f) educational reform including new curriculum with integration of digital technology on teacher education programme in the higher education (Badia, Meneses & Sigales, 2013; Blannin, 2015; Hew & Brush, 2007; Munyengabe, Yiyi, He & Hitimana, 2017; Papaioannou & Charalambous, 2011; Pelgrum, 2001; Shadreck, 2015; Sipila, 2014; Vrasidas, 2015).

The lack of research on the integration of ICT in international baccalaureate (IB) education is an inhibitory factor for this study to make comparisons but on the other hand contributes to the production of new knowledge on the topic and makes the study unique. However, the research findings of the project 'Integration of Technology in the IB Diploma Programme' in 2014 shown that while the use of digital technology in teaching and learning is more and more qualitative and quantitative developing in IB education, the pedagogical issues of technology should hold over priority of stakeholders who are leading these developments whether they are students, teachers, IB and ICT coordinators, IB curriculum developers, or education managers. Nevertheless, according to IB teachers' perceptions, the research has shown that the teachers' barriers that prevent to ICT use in educational processes are: (a) insufficient technical support; (b) lack of funds to purchase educational content/material; (c) no, or unclear, benefits on the using of ICT for teaching; (d) pressure to prepare students for the international exams; (e) school space organisation and school time organisation; (f) appropriate ICT material does not exist in IB schools and (h) not enough computers in IB school classrooms (Cooker, Crook & Ainsworth, 2014).

2. Aim of the study

This study seeks to develop a critical understanding of the IB primary years programme (PYP) teachers' perceptions on the integration of ICT in teaching and learning processes. The overall aim is to gain a deep understanding of IB PYP teachers' perceptions on ICT benefits as well as they integrate ICT in their teaching. In addition, the purpose of this study is to critically evaluate and explain the barriers and needs of PYP teachers in their efforts to integrate ICT into teaching and learning processes. This educational research also focuses on the comparison across two IB schools in two different countries, namely, Sweden and Greece and investigates if there are any similarities and differences in the research findings. Research on the selected level of education (PYP) in this study is significant because the several challenges that are faced by the school community, teachers and students, should be resolved by the fundamental basis of education and it is none other than the Primary Education. If you do not cope with the obstacles from the root of problem, then they will perpetuate and transfer to higher levels of education (Pantzos, 2017).

Finally, this research on integration of ICT in education is crucial in the field of international and comparative education (ICE). The common theoretical framework about the role of ICT in the PYP in different IB schools in all around the world fits within ICE research.

2.1. Research questions

- What are teachers' perceptions on the usefulness of ICT in teaching and learning in IB PYP?
- How is ICT integrated into teaching and learning in IB PYP classrooms?
- What are the teachers' barriers that prevent them from integrating ICT in teaching and learning processes?
- What are the teachers' needs so that they can integrate ICT successfully into teaching and learning processes?

—What is the role of the official ICT policy in PYP classes in IB schools?
—What are the similarities and the differences in the findings between the two IB PYP school settings?

3. Theoretical frameworks and pedagogical approaches

The fundamental areas of knowledge that informed the execution and design of this study as well as the interpretation of the findings are: critical theory and education, critical pedagogy and technology, critical theory of technology (CTT) and critical perspectives on integration of ICT in education.

More specifically, the basic philosophical aim of critical theory is to 'uncover the interests at work in particular situations and to interrogate the legitimacy of those interests, identifying the extent to which they are legitimate in their service of equality and democracy. Its intention is transformative: to transform society and individuals to social democracy' (Cohen, Manion & Morrison, 2007, p. 26).

Critical pedagogy and critical theory are interrelated, since critical pedagogy is an educational interpretation of postmodern critical theory (Kanpol, 1994). Moreover, critical pedagogy can be epitomised as a practical and political effort that tries to influence experiences that will impact on the understanding of educational issues (Giroux & Simon, 1989).

CTT refuses the 'techno-utopianism' of those who claim there is a panacea-technical solution for all challenges and barriers facing teachers and students. In addition, CTT analyses that 'technologies are not separate from society but are adapted to specific social and political systems' and their use urges and reinforces the values, perceptions and 'truths' of those systems. Thus, technology is not considered as economically or politically neutral (Feenberg, 2009).

Finally, many positivist studies have shown that the use and finally the integration of ICT in teaching and learning can be succeeded, if the experts realise the barriers and the needs about the use of ICT for educational benefit, as well as understand these research findings. Thus, innovative ICT policies and funding investments are implied. However, five enduring myths have been discussed in order to develop a critical framework and understanding of the ways in which these findings are used not only to reinforce state apparatus but also to redefine social practices within education. According to Waller (2007), these five enduring myths on the utilisation of ICT in education are summarised as: (1) technology is considered as a neutral tool; (2) setting ICT in schools and classrooms automatically leads learning gains; (3) increasing accessibility of educational technology makes the teachers more efficient and professional; (4) equipping classrooms and schools boost ICT equals to school improvement and (5) students should have increased ICT literacy so that they become employable (p. 289).

4. Research methodology

4.1. Research design

The research design fits out a framework for the gathering and analysis of data (Bryman, 2016, p. 40). This educational research, case study, is going to be a comparative one. This research is a cross-national study and for this reason the Bray and Thomas Cube for Comparative Education Analyses is applied for the setting of a comparative framework for this research study (Bray, Adamson & Mason, 2014, p. 9). More specifically, the research focuses on integration of ICT in teaching and learning as a teaching method from the aspect of education. It takes IB PYP teachers as the nonlocational demographics group and focuses on the geographic/locational level of Sweden and Greece and their IB schools in Stockholm and Athens area.

4.2. Research strategy

This study seeks to investigate the participants' beliefs on integration of ICT in teaching and learning in international primary education. Because of the nature of the research question, this research is a qualitative case study of an interpretive nature, within the frames of critical approach and pedagogy. Furthermore, interpretivism is used to analyse and compare the qualitative data based on the teachers' perceptions and critically identify the way these teachers' beliefs are shaping the integration of ICT in teaching and learning. In addition, the purpose of this research is not to understand and gain knowledge of the cases by using an inductive approach but to reveal the hidden mechanisms that influence to participants' opinions, through critical approaches, since knowledge is socially constructed and is produced by power, as well as, it is an expression of power rather than truth (Mack, 2010, pp. 9–10). As a consequence, in this study, abductive reasoning characterises the use of theory.

4.3. Research methods

As the nature of an interview is a production of knowledge in a qualitative research, semi-structured interviews are conducted in this study. The questionnaire of the semi-structured interviews includes questions and sub-questions into thematic categories so that the research questions are covered (Bryman, 2016, p. 468). Moreover, it is important to highlight that two separate interview questionnaires are designed, one for the teachers and one for the coordinators, tailored to the different roles that they have at schools.

4.4. Sampling design and selection process

Because of the characteristics of a qualitative research (Bryman, 2016, p. 407; Cohen et al., 2007, p. 114), purposive sampling is used in this research. The teachers and coordinators participating in this research are selected based on four criteria, ensuring that: (a) participating schools are IB international primary schools; (b) schools are located in urban areas, such as Stockholm and Athens for better accessibility; (c) teachers and coordinators interviewed are teaching in PYP classes, using ICT tools in their teaching and (d) scalable use of ICT by teachers in their classrooms. These criteria are determined for compatible and reliable sample in both countries. Two IB PYP schools are selected from each country so that the research can be feasible. In each school, four teachers and one coordinator are interviewed. In total, ten participants are interviewed taking place in this educational research.

4.5. Data collection methods

For investigating the beliefs, views and practices of teachers and coordinators, semi-structured interviews are employed and open-ended questions are conducted with the interview process to be rather flexible, lasting approximately 45 minutes. Both teachers and coordinators in Sweden and Greece are interviewed in English, since the main language of instruction in IB schools is English. Finally, interviews are recorded using digital tools, such as voice recorder mobile phone application and Skype recording, and the collected data are transcribed and analysed thematically.

5. Data analysis

IB ICT policy documents are analysed using qualitative content analysis. As noted by Bryman (2016), this approach comprises 'a searching-out of underlying themes in the materials being analysed' as well as it 'lies at the heart of the coding approaches that are often employed in the analysis of qualitative data' (pp. 563–565).

A thematic analysis approach is employed for the qualitative data analysis, since it is a common approach that can be conducted in relation to qualitative content analysis (Bryman, 2016). In addition, charts of key themes and subthemes for the interviews are made. More specifically, making themes is considered as the links of making comparisons between the two IB schools into two different countries, Sweden and Greece.

Furthermore, Bereday's comparative design is adopted as a four-step method of comparative analysis from an interpretive point of stance, consisting of description, interpretation, juxtaposition and simultaneous comparison (as cited in Manzon, 2007, pp. 86–87). Afterwards, differences and similarities are determined and in the discussion part of this study, the empirical data are compared simultaneously. Finally, divergences and convergences among participants' discourses, schools and policy are identified.

All in all, it is important to point out that throughout the qualitative research analysis, the critical approach theoretical framework is applied in order to investigate and identify the perspectives that are drawn from the data.

5.1. Findings

The main themes identified after the re-reading and coding of interviews included teachers' perception. The data are organised following the below themes and sub-themes including questions of the interview guide (see Figures 1 and 2). However, despite the fact that the main themes that are identified in IB PYP school in Greece remain the same as in Sweden, the sub-themes are different as following below.

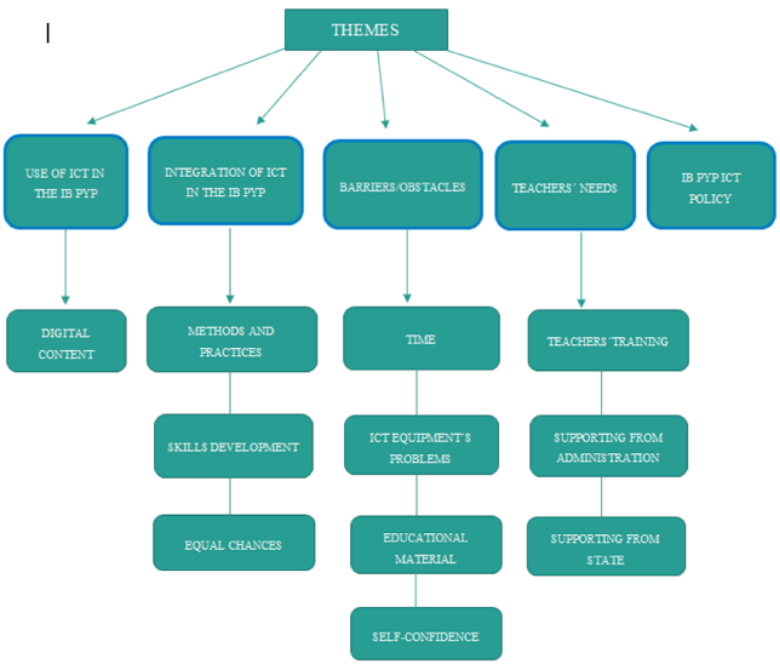

Figure 1. Themes and sub-themes for Sweden

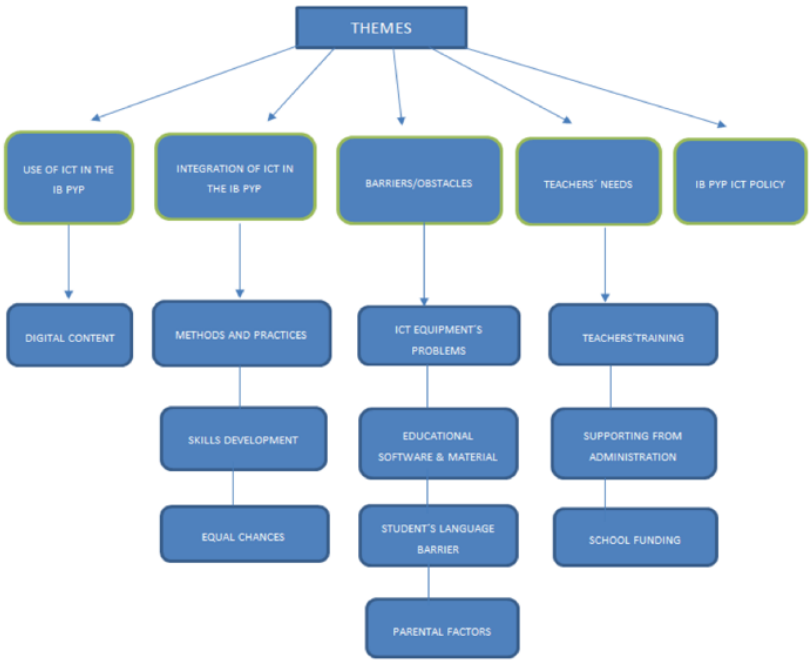

Figure 2. Themes and sub-themes for Greece

The teachers identified several different kinds of immediate cause about the necessity of using ICT in IB PYP, including IB curriculum, IBO and government.

> *In research-inquiry process, I think that it is a quiet obvious reason because of IB PYP framework and curriculum (teacher-Sweden).*

The teachers try to find and use free source available on the Internet; however, the majority of teachers pay on their own electronic subscriptions to download digital content which fits to IB PYP subjects. In addition, the teachers avoid to search on IB organisation for digital content because of lack of sources and ICT material on IBO website.

> *I would like to say also about how much I am disappointed about the IB official documents regarding to teaching material. It is so boring to find content from IBO sites (teacher-Sweden).*

The teachers usually ignore the fact that the integration of ICT is when the technology-inspired pedagogy and ways of thinking, since they are not following a specific pedagogical approach in their teaching according to their perceptions, but they serve the cognitivist, constructivist and behaviourist approaches unconsciously and equally good, and they are conducive to individualistic confinement, as well as to more cooperative forms of their teaching.

> *...If I observe that the students use ICT in an inefficient way then I use the traditional way of teaching with books and exercises. In that case, I prefer to show them special videos through projector, or/and to give copies of articles or magazines and work on it (teacher-Sweden).*

The teachers seemed to cannot realise the complexity of critical thinking for empowerment. Both teachers and coordinators set dispositions, such as creative and the desire to be well-informed as relevant to critical thinking.

> *The ICT can foster critical thinking of students and this learning outcome could be seemed when the students present their projects from the way of presenting their findings of inquires as well as by what apps and programmes, they used to create something (IB PYP coordinator-Greece).*

The teachers did not able to find extra time for learning the full potential of technologies in order to feel more comfortable with ICT. The lack of time for the plan, use and finally the integration of ICT in the educational process seemed to be due to the intensification of teachers' work.

> *All of the process of integration of ICT is very hard to be planned. It takes a lot of time for me and it takes a lot of time for the children and it does not have always fast results for them (teacher-Sweden).*

The teachers underlined the significance of their professional development as one of the key aspects to overcome the problems and difficulties. Both teachers' perceptions and coordinator's evaluation are seemed that there is heterogeneity in ICT teachers' training needs.

> *I believe that all the teachers in the school should have ICT training and this hasn't happened yet. The school leadership and school's financial budget are the cause (teacher-Sweden).*

Both IB PYP coordinators and teachers claimed that the school does not receive enough support from the municipality (the state follows decentralised system) in Sweden and the IB school is fully private in Greece, as well as, there is no economic support from the IBO as it is a non-profit governmental organisation.

> *The IB organisation provides us only the philosophy and guidelines but there is no enough support on ICT implementation and integration in teaching and learning (teacher-Sweden).*

Finally, most of the teachers both in two countries stated that they do not have any idea about the existence of an official document on IB PYP ICT policy about the role of ICT in IB PYP classrooms. However, if there is any news or new strategy for integrating ICT in to PYP, they are probably going to be informed through meetings or emails from their coordinator.

> *No, I do not know that there is IB PYP ICT policy! I cannot remember! (teacher-Sweden)*
>
> *I must tell you that it is very weak! The including descriptions and their's content are very brief, complex and general. I do not give any further matter on this document. I have already forgot it (teacher-Greece).*

6. Discussion of findings

6.1. Comparing teachers' and coordinators' perceptions

With regards to how and what IB PYP teachers use digital content in their classes, all teachers from both IB PYP schools try to find and use free sources available on the Internet. However, the majority of teachers need to pay on their own for electronic subscriptions in order to download digital content which matches to IB PYP subjects. First, this factor causes additional financial burden for teachers as well as they are reluctant, scared and determined to accept the status quo of school. Second, as Apple (2003) has stated, the teachers' reliance on pre-packaged software can be the reason for losing skills and dispositions, since local curriculum planning and evaluation become obsolete (deskilling, see also Apple, 2008). Through searching for online curriculum materials to fit in teaching and learning processes, teachers become 'isolated executioners of someone else's plans' (Apple, 2003, p. 448). Moreover, the already pre-packaged material can determine the content and format of the lessons lacking further intervention of teachers (separation of conception from execution). Thus, the technocratic definitions of technology result in non-social groups of technical skills and neutral mechanisms and it is appearing just as a common sense. Finally, teachers are used to perform these practices, however, without understanding why these occur in this rationale way.

In accordance with the methods and practices of teaching and learning with ICT, teachers in both IB PYP schools predominantly emphasise more on the implementation of New Technologies than the integration of ICT in teaching and learning in which learning theory or pedagogy should be implemented. For this reason, they are often trapped in philological and overused progressive

pedagogical theories and methods, and their depreciation in an 'adapted application' to, in other respects, conservative and technocratic teaching, and learning practices and adhere to encyclopaedic curricula such as IB PYP ICT policy and curriculum (Ντρενογιάννη, 2010).

Furthermore, the teachers in both IB schools seemed to still struggle to define and orient critical thinking and how fostering critical thinking could be achieved through integration and implementation of ICT in the educational process. The teachers cannot realise the complexity of critical thinking for empowerment. Both teachers and coordinators set dispositions, such as to become creative and the desire to be well-informed as relevant to critical thinking. However, according to Kincheloe (2000) when the psychologised critical thinking is trapped and is sophisticated within a modernist logic and its dispositions, this is called 'uncritical critical thinking'. Hence, it is considered as hyper-rationalised, lowered micrological skills that support a pattern of procedural knowledge. Moreover, the political and ethical orientations of thinking have been removed from the uncritical critical thinking (p. 26). In an uncritical context, such as the predetermined curricula and educational policy documents, the teachers cannot realise the complexity of critical thinking for empowerment (Macedo, 1994). The critical content analysis of IB ICT document reveals that the formulated notion of critical thinking is based on the norms of ratiocination, behaviourist approach and critical thinking psychologised patterns, which completely matches in the modern neo-liberal democracies, such as Sweden and Greece.

As far ICT equipment is concerned that all IB PYP school teachers in Sweden stated that there are not enough computers or laptops, iPads and smartboards in their PYP classrooms and in some cases, they need to share them. In addition, the teachers in Greece believed that the lack of ICT equipment is due to low school's financial budget and parents' financial burden for purchasing iPads for their children. Cuban (1993) and Scrimshaw (1997) emphasise that any 'potential' of ICT in schools arises out not from the ICTs itself, but out of the critical interaction between teachers and students in the context of using ICT in the classroom and in the context of integration of ICT in teaching and learning (Cuban, 1993; Scrimshaw, 1997).

Besides this, the IB PYP teachers and coordinator in Sweden seemed to agree with each other about the lack of time as the most important barrier on their efforts to successfully integration of ICT in the educational process. Moreover, despite the fact that the teachers in Greece did not refer to lack of time as an obstacle, they seemed to spend a lot of their leisure time on searching and preparation of ICT's implementation in their classrooms. Apple (2008), regarding digital technology in schools, argues that the students' needs are mostly ignored or dispelled by teachers and educational policy who rush to find a certain negativity and complaints as typical adolescent behaviour in schools. This happens because of huge teachers' workload on other managerial and control practices, out of their framework responsibilities in school. Furthermore, teachers' working practice is also intensified outside of the school setting, since they use their laptops or computers or tablets at home, working online and being contactable through mobile phones at any time both in school and home (intensification of work). The intensification of teachers' workload not only influences their efficiency and professionalism in schools, but also teachers' leisure time in their lives. According to Waller (2007), the intensification of teachers' workload 'blurs the boundaries between work and leisure—the lifetime/work-time distinction becomes unclear. Thus, educational technology enhances the surplus value of teachers' (p. 303). From the above, it is evident the fact that teachers perceive lack of time as a barrier to the integration of ICT, which could be critically explained by the intensification of their work.

In addition, the IB PYP teachers in Greece identified that English language can be a barrier to students' learning through the integration of ICT. The students in Greece face English language difficulties on iPads' apps. However, despite the fact that there was not the same issue in the IB PYP school in Sweden, research has shown that many teachers who are working in international schools referred problems with Apple Company in Sweden, which had to do with multiple downloading of apps that needs to be tested in the English setting (Jackson & Cooper, 2016). Knowledge is commercialised; students have become objects of the commodification of education and schools

operate as businesses (Boyd, 2016). Under this prism, it is revealed that these companies are not taking into consideration languages' settings, as well as students' and teachers' needs, since the pedagogical design and mission of these apps are lacking in their development.

In accordance with teachers' needs, it is identified that teachers' training in integration of ICT in educational process is a necessity in both IB PYP schools and the hiring of ICT coordinator-pedagogue. Actually, it is also mentioned that teachers' training on ICT and the needs of support from school administration and the state are interrelated. The teachers in both schools claimed that their professional knowledge and ICT skills are insufficient. In addition, governmental and local authorities provide increased external technical support to the schools that is based on private IT companies; however, their support is insufficient and problematic. Finally, according to teachers' perceptions, the persons who work as ICT staff in schools are unqualified and they do not have any kind of pedagogical training (Jackson & Cooper, 2016). It can be argued that state funding to private IT companies should not be a solution for the teachers, since they do not participate in decision-making.

Finally, the teachers and coordinators in both IB PYP schools seem to ignore and resist to IB PYP ICT policy document, since the most of the teachers do not have any idea or it is considered very weak and not enough to help them on the integration of ICT in their teaching. It can be argued here that teachers show their first signs of resistance to the school's educational policy, although the general impact from the school's hegemony on them. Through history, it is evident that workers have created resistance to processes in which they show lack of obedience towards the authority. An apparent example can be strikes in order to achieve higher wages or other benefits. Therefore, Michael Apple states that viewing schools as absolute generative institutions is illogical. Accordingly, students in a classroom show aspects of disagreement, resistance and proportionate autonomy. 'Social reproduction is by its nature a contradictory process, not something that simply happens without a struggle' (Apple, 1995, p. 84). This can be evident though the students' rejections of the explicit and hidden curriculum and the teachers' resistance to the dominant educational policy (Carrero & Cunnigham, 2016, p. 132).

6.2. Convergences and divergences between IB PYP teachers' perceptions on integration of ICT in teaching and learning in Sweden and Greece

In conclusion of discussion of the research findings, it can be asserted that there are not many differences among the teachers' and coordinators' perceptions in both IB PYP schools in Sweden and Greece. Despite the fact that teachers did not state exactly the same barriers of integrating ICT in their schools, this does not mean that there is a vital divergence among their perceptions. This occurs due to the fact that some of those different obstacles are already interrelated with other aspects of research findings, such as the digital content or teachers' needs. Therefore, it would be a good suggestion that the factors that cause these few differences would be further investigated.

Finally, with regards to the teachers' perceptions on their needs for facing the above barriers in their efforts to integrate ICT in teaching and learning successfully, these focus on teachers' training, supporting from the school leadership and the state, and school funding. Although teachers from both schools expressed the same needs, this study critically identified that these needs are not likely to be met by the state-government or a new reform of educational policy, since similar attempts have failed in the past.

7. Limitations and delimitations of the research

This study is conducted as part of a master programme in ICE at Stockholm University. It is an undeniable fact that any research study has certain limitations and delimitations, which affects its complete accuracy and progress. First of all, as a master thesis, the analysis of the data cannot be exhaustive due to restricted time and the limited size of this study.

This educational research is qualitative and comparative case study limited to two primary IB schools, in Sweden and Greece. As a consequence, this could be considered as a small-scale study. For this reason, the production of generalisations is not the aim of this research, rather to critically interpret teachers' perceptions through critical theory and other critical studies within ICE and ICT in education.

In conclusion, it is also important to underline that the IB official document referring to the role of ICT in PYP is not used as a panacea tool to accurately analyse its content. It is used as a guide for a better understanding of IB ICT policy philosophy and teachers' perceptions on integration of ICT in teaching and learning.

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