

The University of Greenwich MA in Education

Creating an Inspiring Educational Environment and

Using Effective Learning Methods in Primary Education.

by Rahime Buyukkurt

Name: RAHIME BUYUKKURT

University: Greenwich

Student ID: 000998758-4

Lecturer: Rania Hafez

Programme of Study: MA EDUCATION

Course Title: Enquiry Project-RESE1010

Table of contents

Abstract p. 5

Chapter One- The link between inspiring educational environments and effective learning methods
..... p. 5

1.1 Introduction p. 5

1.2 Chapter outline p. 9

Chapter Two- Literature review p. 10

Chapter Three- Methodological section p. 17

Chapter Four-The factors involved in the creation of a successful learning environment based on the use of the inquiry-based method
..... p. 20

4.1 Introductionp. 20

4.2 The use of technology in the classroom environment p. 20

4.3 The push and pull between teacher and student-oriented practices ...
..... p. 23

4.4 The influence of the social interaction between students, parents and teachers ...
..... p. 26

4.5 Conclusion p. 30

Chapter Five- A thematic discussion on the issues affecting the creation of a learning environment based on the use of the inquiry-based
method p. 31

5.1 Introduction p. 31

5.2 The link between creative classroom environments and the inquiry-based method of learning
..... p. 31

5.3 The connection the inquiry-based method of learning and a student-oriented motivational stance p. 34

5.4 Conclusion p. 37

Chapter Six-Conclusion p. 37

Bibliography p. 39



Abstract

This dissertation deals with the link that exists between creativity and motivation when it comes to the implementation of effective methods of learning in a creative classroom environment. The main argument posited in this dissertation is that the inquiry-based method of learning has the potential to create effective and successful learning outcomes for students of primary school age. This dissertation earmarks the factors that facilitate the successful application of the inquiry-based method of learning. These factors include the use of technology as a way of ensuring that the students are motivated in order to take an independent and collaborative stance when it comes to the process of assimilating knowledge. The use of technology has the potential to foster creativity in the classroom, promoting a more personalised ways of learning. Furthermore, this study shows that a student-oriented approach to classroom practice appears to be most effective, provided it is complemented by palliative mechanisms that ensure that all students are able to benefit from the inquiry-based method of learning. Finally, this dissertation also looks at the way in which the social interaction between parents, teachers and students can reinforce the advantages attached to the inquiry-based method of learning, creating a system to monitor the progress made by students in the classroom.

Chapter One- The link between inspiring educational environments and effective learning methods

1.1 Introduction

This dissertation tackles the way in which an inquiry-based method of learning may be used for establishing a creative and stimulating classroom environment. This methodology has the potential to enable primary school students to reinforce knowledge related to vital subjects such as literacy and numeracy in a more effective way (Borich, 2013, p. 141). Additionally, this modality constitutes an active way of learning, which revolves around the presentation of certain problems and scenarios that enable the students to find out information in a more contextualised way (Coffman, 2017, p. 55).

According to the inquiry-based method of learning, the teacher is, in most cases, the person in charge of facilitating the exercises and explaining any doubts that may arise from the inquiries undertaken by the student (Edmonds Alvarado, 2003, p. 173; Burden and Byrd, 2012, p. 77). Consequently, the teacher has a crucial role in stewarding the process of learning, allowing the students to find their own ways of assimilating knowledge; albeit within the context of a framework that enables the educator to identify potential troubles spots. From this standpoint, the role of the educator is to create the palliative mechanisms needed to ensure that all students are able to learn at their own pace (Edmonds Alvarado, 2003, p. 175; Burden and Byrd, 2012, p. 79).

There are several advantages that stem from the use of the inquiry-based method of learning in primary education. This method of learning extends beyond the mere memorisation of facts (Wallen and Fraenkel, 2000, p. 59). At the same time, there is more sustained progress when it comes to the accumulation of knowledge, as a result of the use of prior information, gained through the assimilation of crucial concepts related to the subject matter that is being studied (Edmonds Alvarado, 2003, p. 188). In addition to this, the inquiry-based method allows students to learn from each other in an interactive and collaborative manner (Murnane and Willett, 2010, p. 129). There is a strong sense of empowerment that comes from the application of the inquiry-based method of learning, as the students are able to have more control over the learning process and apply the knowledge gained to situations that occur in real life (Coffman, 2017, p. 68; Burden and Byrd, 2012, p. 98). This is one of the main advantages of the inquiry-based method of learning. This modality allows the student to ensure that the knowledge that is acquired has a generalizable feature that permits its usage in extra-curricular situations (Edmonds Alvarado, 2003, p. 191).

The link between the creation of an inspiring educational environment and the application of effective learning methods is crucially understood within a Constructivist theoretical approach, which takes into consideration the role that the teachers have in projecting certain, “cultural models of meaning, the dialogic function of language, and [the] transformational models

of...education” (Keys and Bryan, 2001, p. 631). There are several methods that have been used to support the application of an inquiry-based method of learning at primary school level (Reigeluth, 1999, p. 153). The use of interactive smart boards is one of the instruments that are currently being used for the purposes of entrenching a more independent modality of learning in primary schools (Watters and Watters, 2007, p. 20). In this manner, the students are able to assimilate the different concepts introduced by the teachers through the use of illustrative material such as audio-visual clips, graphs and pictures, which enables them to have a higher level of engagement with the subjects under study (Reigeluth, 1999, p. 156; Briggs, Coleman and Morrison (eds.), 2012, p. 188). There are, in this context, three important points that are of vital importance for the purposes of understanding the possible benefits derived from the use of the inquiry-based method in the setting of primary education (Briggs, Coleman and Morrison (eds.), 2012, p. 191). To begin with, this method relies on the ability of the teacher to establish a creative learning environment (Watters and Watters, 2007, p. 22; Burden and Byrd, 2012, p. 104). Moreover, the teacher needs to ensure that the students are sufficiently motivated in order to have more independence during the learning process (Murnane and Willett, 2010, p. 131). The literature on the subject of the inquiry-based method of learning indicates that technology plays an important role in ensuring that these two criteria are satisfied (Gormally, Brickman, Hallar and Armstrong, 2009, p.1).

The success of the inquiry-based method of learning depends, by and large, on the ability to ensure that the students retain a high level of curiosity and that they have the proper guidance for the purposes of designing their own experiments (Yoon, Joung and Kim, 2012, p. 589). Furthermore, there is a need to ensure that the students in primary education settings are able to interpret the information that they receive in an efficient manner and that there is a proper balance between the process of inquiry and the guidance received from the teacher (Stacey, 2018, p. 63). It is worth noting that the teacher, as an educational facilitator, should also endeavour to ensure that the students understand the information that is needed in order to carry out their investigations. This situation would result in the proper assimilation of the knowledge gained during the inquiry-based process of learning (Reigeluth, 1999, p. 159). Scholars have found that this method of learning is also

vital to promote the use of critical thinking from a very early age. There is a significant link between the use of a problem-based approach in inquiry-based learning and the establishment of optimal outcomes for students at primary school level (Magnussen, Ishida and Itano, 2000, p. 360).

This dissertation focuses on establishing the best way to create an inspiring educational environment for children at primary school level, bearing in mind the crucial importance that teachers and parents have in facilitating the effective application of this framework of reference (Wallen and Fraenkel, 2000, p. 62). Moreover, this dissertation aims to determine the best way to ensure that primary school students are exposed to the most effective learning methods, so that they can become successful learners (Murnane and Willett, 2010, p. 136). There are a number of interconnected variables that will be examined in order to ascertain the best way in which to advance effective learning outcomes through the inquiry-based method (Briggs, Coleman and Morrison (eds.), 2012, p. 194). These include the connection between creativity and motivation, the use of technological tools, the advantages of the student-oriented and teacher led practices and the interaction between parents, students and teachers. Another important aspect that concerns the establishment of an inspiring learning environment is related to the question of whether the method to be utilised should revolve around a student-oriented practice or teacher-based practice, or both (Briggs, Coleman and Morrison (eds.), 2012, p. 197). This has significant implications for determining the range of instructional strategies to be employed in order to create an inspiring learning environment (Wallen and Fraenkel, 2000, p. 72; Krathwohl, 2009, p. 40). Furthermore, it is also important to determine which technological devices and programmes should be used in order to facilitate an independent and interactive approach to learning. Particular attention will also be given to the role that effective social interactions have in the creation of a stimulating learning environment based on inquiry-based methods (Gormally, Brickman, Hallar and Armstrong, 2009, p. 2). It is understood that a successful social interaction between parents, students and teachers is a useful tool to establish an inspiring learning environment, as it constitutes an important conceptual framework of reference in order to appraise the progress made by children of primary school age when it comes to assimilating knowledge in an independent and

collaborative manner (Murnane and Willett, 2010, p. 142). The ability to learn in an independent manner is inextricably connected to the degree to which the learner is motivated to do so. Therefore, it is important that children of primary school age can count on the support of parents and teachers in order to deal with any potential drawbacks and pitfalls derived from the use of inquiry-based method of learning (Gormally, Brickman, Hallar and Armstrong, 2009, p. 4).

1. 2 Chapter outline

The second section of the dissertation will introduce a literature review on the subject of the inquiry-based method of learning as well as the theoretical perspective provided by the Constructivist approach in education, in an attempt to provide an up-to-date orientation on the issues surrounding the establishment of a creative learning environment in the primary school setting. The third part of the dissertation will deal with the methodological issues involved in the research, paying attention to the importance of the thematic approach in the process of discovery as to what extent the issues of creativity and motivation underpin the success of the inquiry-based method of learning in the primary school environment. The fourth chapter will examine a number of variables that stem from the examination of the literature on the inquiry-based method of learning in primary schools. This section will give special attention to three factors involved in the establishment of a creative learning environment based on the use of a solid motivational stance. First, the use of technology in the classroom environment. Second, the importance of the push and pull between teacher and student oriented practices. Third, the influence of an effective social interaction between students, parents and teachers. The fifth chapter of the dissertation will examine the variables mentioned in the last section according to a thematic criterion. The purpose of this section is to ascertain the nuances involved in the linkage between creativity, motivation and the inquiry-based method of learning. The sixth chapter of the dissertation will present a number of conclusions derived from the research carried out in this area. This section will also examine the way in which the findings of the dissertation are able to contribute to the scholarship on the subject of inquiry-based learning, specially in relation to the teaching practice at primary school level. Finally, this section

will also consider a number of recommendations for developing the research topic as well as possible improvements in relation to professional practice, the learning process, and the resources that are needed to make an effective use of the inquiry-based method of learning.

Chapter Two- Literature review

This literature review will examine two areas of study that are crucial for the purposes of determining the best way to create effective and inspiring learning environments. This literature review broaches the main aspects related to the inquiry-based method of learning in conjunction with an examination of the Constructivist approach to learning. Constructivism is an educational approach that sees learning as a process in which the learner plays an active role. One of the most important factors involved in the Constructivist philosophy of learning is that the learner has a vital role to play in the establishment of subjective meanings about the social reality that surrounds her or him (Borich, 2013, p. 145). Constructivism arises as a response to the narrow approach that is part and parcel of the behaviourist method of learning, which is based on a didactic paradigm. The contextualised approach propagated by the Constructivist method emphasises the importance of the learner as an active agent in the construction of knowledge (Borich, 2013, p. 149). The personal experience of the learner and her or his subjective way of examining the nature of reality influences the manner in which knowledge is constructed (Mairers and Sandvold, 2010, p. 174). The pedagogical approach used by Constructivism involves a philosophical orientation where the instructional methods facilitate the establishment of a subjective interpretation of material facts (Mairers and Sandvold, 2010, p. 176). The main role of the Constructivist approach is to ensure that the learner is able to expand her or his capacity to think about the nature of reality in critical terms. The Constructivist approach reacts to the tenets of behaviourism by positing that the learner does not come into an educational environment with a blank mind. Therefore, in order to create a stimulating and effective learning environment, there needs to be reference to the knowledge and beliefs about the world that has been accumulated by the learner (Gall, Gall and Borg, 2006, p. 167). The successful deployment of a Constructivist

pedagogical method in the creation of a stimulating and inspiring learning environment depends on a number of important factors (Maiers and Sandvold, 2010, p. 177). The contribution made by Constructivist approach is bolstered by the systemic and contextualised philosophy postulated by “activity theory,” which “provides an appropriate framework for analyzing needs, tasks, and outcomes for designing” inspiring learning environment. Jonassen and Rohrer-Murphy argue that, “activity theory is a socio-cultural, socio-historical lens through which designers can analyze human activity systems, [focusing] f on the interaction of human activity and consciousness within its relevant environmental context” (Jonassen and Rohrer-Murphy, 1999, p. 61). Activity theory is an important framework of reference for bridging the gap between the subjective meanings that the learner attaches to the process of construction of knowledge and the objective reality that surrounds her or him (Lodico, Spaulding and Voegtler, 2010, p. 121). This is an aspect of Constructivist theory that has significant repercussions for the creation of effective and inspiring learning environments (Gerlach and Bieger, 1996, p. 93). The use of “activity theory” allows the student to be exposed to the different social norms that underpin the social construction of knowledge (Coffman, 2017, p. 98; Burden and Byrd, 2012, p. 120). In this manner, the Constructivist approach to learning is able to fulfill an important social function, particularly as it concerns the building of human and social capital (Lodico, Spaulding and Voegtler, 2010, p. 142). Coupal highlights the importance of a human capital theory orientation that underscores the implementation of a Constructivist theory of learning, underlining the need to reformulate, “educational policy” by emphasising “accountability and the measurement of students’ achievement of technological skills against standard learning outcomes” (Coupal, 2004, p. 587). Constructivism is an important philosophical orientation in order to produce learning outcomes that are not standardised according to narrow definitions imposed by bureaucratic apparatuses, which are oftentimes interested in linking the provision of educational opportunities to the rationalisation of economic resources (Gerlach and Bieger, 1996, p. 96). Constructivism is a useful philosophical orientation for the purposes of personalising the method of learning, particularly at primary school level. Technology is a medium that is capable of aiding the the acquisition of knowledge in a creative way (Gerlach and Bieger, 1996, p. 99).

Technology has produced significant changes in the way in which the learning process unfolds. In order for the learning process to be effective, it needs to reflect the specific social environment in which it takes place (Gall, Gall and Borg, 2006, p. 162). Bhattacharjee maintains that there are important epistemological and deontological considerations regarding the Constructivist method of learning in the primary school environment. To begin with, Bhattacharjee holds the view that, "Constructivism is an epistemology, or a theory, used to explain how people know what they know. Fundamentally, constructivism says that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences" (Bhattacharjee, 2015, p. 23). There are, therefore, important practical implications derived from the use of a more interactive approach in the process of learning. Bhattacharjee argues that, "Constructivism is a theory that asserts that learning is an activity that is individual to the learner. This theory hypothesizes that individuals will try to make sense of all information that they perceive, and that each individual will, therefore, "construct" their own meaning from that information" (Bhattacharjee, 2015, p. 23). It is worth noting that the Constructivist approach has been criticised by behaviouralist pedagogical experts by referring to the fact that, oftentimes, the student is not able to assimilate basic concepts in areas such as literacy and numeracy (Gall, Gall and Borg, 2006, p. 165). This is because the Constructivist approach places a significant level of importance on honing the critical skills of the learners, instead of ensuring that that the students are able to acquire essential competencies (Gall, Gall and Borg, 2006, p. 167).

The Constructivist approach is an important philosophical perspective in order to appraise the full implications of the inquiry-based method of learning (Coe, Waring, Hedges and Arthur (eds.), 2017, p. 154). The active method of learning propounded by the inquiry-based method is centred on postulating a certain problematique that is useful in order to instigate the search for autonomous ways to acquire knowledge about the topics that are being investigated by the learners (Johnson and Christensen, 2016, p. 122). This bottom up approach to learning is considered to be more in line with the increasingly digital environment that characterises modern education (Coe, Waring, Hedges and Arthur (eds.), 2017, p. 157). The inquiry-based method of learning is characterised by its rejection of the method of knowledge acquisition that is based on the

memorisation of concepts and facts (Lodico, Spaulding and Voegtle, 2010, p. 150). There are a number of elements that feature in a prominent manner within the inquiry-based method of learning. To begin with, the learner is encouraged to ask her or his own questions regarding the fact that is being observed and/or examined (Creswell, 2004, p. 51). This is something that facilitates the establishment of critical skills as part of the learning process. At the same time, the inquiry based method of learning entails that the learners are in charge of finding evidence in order to verify the information that is being presented to them (Creswell, 2004, p. 58). Furthermore, the student-oriented implications attached to the inquiry-based method of learning prompts the learner to understand the nature of the evidence that is presented, with the ultimate view of consolidating the process of learning (Johnson and Christensen, 2016, p. 131). The explanations that are gained through the process of investigating the fact that is being grappled with enable the learner to reinforce her or his level of knowledge in the particular area of study (Creswell, 2004, p. 82). This process is crucial in order to enable the learner to acquire argumentative skills that are necessary for the purposes of developing a critical view of social reality. There are a number of important elements that underscore the validity of the inquiry-based method of learning (Johnson and Christensen, 2016, p. 137). To begin with, this method of learning can be used as a tool to confirm the veracity of the knowledge that has already been assimilated. Moreover, the inquiry-based method enables the learner to delineate a structured path in order to make inquiries about the fact that is being observed (Johnson and Christensen, 2016, p. 140). The inquiry-based method of learning is therefore able to provide guidance about the steps that need to be undertaken for acquiring knowledge in a manner that corresponds with the social experience accumulated by the learner (Maiers and Sandvold, 2010, p. 178). The most important element attached to the inquiry-based method is that it creates an open learning environment that allows the learner to enhance her or his critical skills and acquire knowledge that is highly relevant to him or her (Lodico, Spaulding and Voegtle, 2010, p. 152). In any case, this method of learning has been the recipient of a significant amount of criticism. Kirschner, Sweller and Clark states that the inquiry-based method of learning, "ignores both the structures that constitute human cognitive architecture and evidence from empirical studies over the past half-century that consistently indicate that minimally guided instruction is less effective and less efficient than instructional approaches that place a strong emphasis

on guidance of the student learning process” (Kirschner, Sweller and Clark, 2006, p. 75). Indeed, it seems that those who are able to benefit from the inquiry-based method of learning are the students who already have previous knowledge about the material facts that are being investigated. The authors mention that the, “advantage of guidance begins to recede only when learners have sufficiently high prior knowledge to provide “internal” guidance” (Kirschner, Sweller and Clark, 2006, p. 75). In addition to this, it is difficult to see the manner in which the inquiry-based method of learning may be used for streamlining learners according to different levels of ability, particularly in critical subjects such as literacy and numeracy (Lodico, Spaulding and Voegtle, 2010, p. 177).

However, the inquiry-based method of learning has a level of flexibility that is useful in order to create a wider level of inclusion, particularly amongst students that come from a disadvantageous social background (Lochmiller and Lester, 2016, p. 49). There seems to be a glamorisation of the inquiry-based method of learning that arises from the experience of countries that are experiencing high outcomes in educational performance, such as Finland and Sweden (Murnane and Willett, 2010, p. 129). However, it is not clear whether the same methodology can be replicated in countries with a different socio-cultural orientation in the sphere of education (Coffman, 2017, p. 69; Burden and Byrd, 2012, p. 99). Notwithstanding the criticism levelled at the inquiry-based method of learning, it could be argued that the inquisitive approach that characterises this pedagogical approach facilitates a more meaningful acquisition of knowledge amongst learners of primary school age. At the same time, the use of technology enables an effective propagation of the inquiry-based method of learning amongst learners from different social and cultural backgrounds. Moreover, the inquiry-based method of learning provides educators with the opportunity of merging digital and real-life platforms. Shih, Chuang and Hwang state that, “the learning activities between the field and the digital system not only demonstrate the practices of mobile learning, which emphasizes learning that happens close to real life, but also provides digital learning content to facilitate students’ field studies. To enhance the learning performance of the students, an inquiry-based mobile learning approach is employed to assist the students in constructing their own knowledge by taking cognitive load into consideration” (Shih, Chuang and Hwang, 2010,

p. 50). In this context, it seems that the inquiry-based method of learning has the potential to increase performance amongst students from all backgrounds and facilitate the entrenchment of critical skills amongst primary school learners.

The spread of technological devices and programmes have facilitated the propagation of the inquiry-based method of learning in the primary school setting. Dunleavy and Dede underline the importance that technology has as a, “cognitive tool and pedagogical approach.” The authors highlight the positive implications of the use of augmented reality, particularly when it is, “aligned with situated and constructivist learning theory, as it positions the learner within a real-world physical and social context while guiding, scaffolding and facilitating participatory and metacognitive learning processes such as authentic inquiry, active observation, peer coaching, reciprocal teaching and legitimate peripheral participation with multiple modes of representation” (Dunleavy and Dede in Spector, Merrill and Elen (eds.), 2014, p. 735). From this standpoint, it is possible to argue that the inquiry-based method is a crucial instrument in order to create an inclusive and stimulating learning environment. Technological platforms are able to provide learners with the different levels of ability in crucial areas of learning with the opportunity to expand their knowledge in a playful manner.

Maor and Fraser also highlight the importance of technology in the use of an inquiry-based method of learning. The authors state that the use of technology as a “classroom environment instrument” has a significant level of importance in “promoting inquiry skills,” as seen in the increase of “student-perceived investigation and open-endedness” (Maor and Fraser, 1996, p. 401). It should be noted that the literature on the inquiry-based method of learning postulates that the successful implementation of technology-based pedagogical tools depends on the effective input given to the learners by the teachers. In this context, it is important to remark that the inquiry-based method of learning emphasises the need to take into consideration student and teacher-oriented practices. There is also a need to ensure that the inquiry-based method of learning is properly situated, in order to take advantage of the experiential knowledge previously gained by the learner. Hwang, Chiu and Chen argue that the inquiry-based method of learning, “can be in the form of a problem or task for

triggering student engagement. However, how to situate students in meaningful inquiry activities remains to be settled, especially for social studies courses” (Hwang, Chiu and Chen, 2015, p. 13). There is, therefore, a need to make sure that the activity-based learning environment is conducive to reinforce the critical skills that would allow the learners to reflect upon the conditions that affect her or his process of learning (Gerlach and Bieger, 1996, p. 70).

There is, in the literature on the subject, a concern about ensuring that the inquiry-based method of learning is able to provide students with a sufficient grounding in vital areas such as literacy and numeracy. The idea of a “grounding” in those subjects is linked to the implementation of certain teacher-oriented pedagogical methods (Gerlach and Bieger, 1996, p. 76). The successful application of the inquiry-based method of learning compels the teacher to be aware about the social determinants involved in the construction of knowledge (Coffman, 2017, p. 75; Burden and Byrd, 2012, p. 108). Jaleel and Verghis underline that, “educators must understand the dynamic nature of knowledge itself in order to practice effective knowledge management in multi-disciplinary contexts” (Jaleel and Verghis, 2015, p. 8). The authors also point out that it is imperative that the teacher selects the content involved in the delivery of the lessons in a effective manner, in order to ensure that the learner is properly stimulated for the purposes of taking charge of her or his learning process. The authors also highlight that, “it is also crucial for educators to focus on effective methods of delivering content, the media used, and the overall quality of the instruction materials. Information technology facilitates knowledge management practices by disseminating knowledge and making codified knowledge retrievable” (Jaleel and Verghis, 2015, p. 8). It is important to take into consideration that the current cohort of learners at primary school level has been born in the age of internet and ubiquitous and immersive technology. The literature on the subject of inquiry-based method of learning has highlighted the significance of “capture technology” as an instrument capable of consolidating the knowledge gained in the context of the activities that take place in the classroom. The use of equipment and software that records the activities undertaken by the learners enhances the level of motivation in the classroom environment and reinforces the usefulness of implementing flexible methods of learning (Coe, Waring, Hedges and Arthur (eds.), 2017, p. 63). Capture technology provides students

and teachers with an important feedback instrument in order to evaluate classroom performance. A digital classroom environment, facilitated by the presence of capture technology, is able to stimulate the process of learning amongst students (Coe, Waring, Hedges and Arthur (eds.), 2017, p. 65). Berardi and Blundell argue that “capture technology” has a great role to play in order to entrench a Constructivist approach to learning in the school environment. The authors maintain that “capture technology” requires students to take what they have learned and apply it to settings that are relevant to them. Furthermore, capture technology can be used “to develop learning support resources, known as scaffolds, and to improve assignment integrity and assurance of learning” (Berardi and Blundell, 2014, p. 73). In this manner, it is possible to argue that the creation of a digitalised classroom environment has the potential to accentuate a Constructivist approach capable of enabling the learner to have a more effective command of the process of knowledge acquisition (Johnson and Christensen, 2016, p. 133). As we can see, there is a complex and intricate connection between the Constructivist philosophy of education and the inquiry-based method of learning. The relationship between Constructivism and the inquiry-based method of learning is able to shed light on the best mechanisms that need to be applied in order to create a creative learning environment that is based on the positive stimulation of the learners and the honing of their critical skills.

Chapter Three-Methodological section

This section of the dissertation examines the main methodological tools to be employed in order to identify the link between the use of the inquiry-based method of learning and the promotion of a creative learning environment that is able to motivate learners of primary school age. The main research question of this dissertation is: to what extent is the approach based on the elements of creativity and motivation vital in order to ensure the success of the inquiry-based method at primary level? The writing of the dissertation will be guided by three additional research hypotheses, outlined in an interrogative manner. First, how significant is the use of technology in the establishment of an effective learning environment that is centered on the inquiry-based method of learning? Second, what is the link between creativity and motivation in the establishment of

critical thinking amongst students exposed to the inquiry-based method of learning? Third, what kind of effective learning methods can teachers use to induce successful learning processes?

The methodology to be employed for the purposes of assessing the effect of an inquiry-based method of learning will consist in the examination of the literature concerning the use of inquiry-based methods in the creation of an inspiring learning environment (Bryman, 2015, p. 40). There will be thematic approach directed towards establishing the different strategies that are to be utilised for the purposes of creating an inspiring learning environment based on the values of creativity and motivation. This methodology is useful in order to determine the factors that transpire from the application of the inquiry-based method of learning at primary school level (Bryman, 2015, p. 48). It has been argued that the, "thematic analysis is a method for identifying, analysing and interpreting patterned meanings or 'themes' in qualitative data" (Braun, Clarke and Terry, 2014, p. 95). A thematic analysis is one of the most significant branches of qualitative research. Alhojailan highlights that qualitative research is underpinned by two principles. The first principle is, "to compact extensive and diverse raw data into a succinct structure...by organising oral and write the data into charts and tables. This provides the researcher the opportunity to identify, compare and determine the data upon which to focus. The second principle is to make the relationship between the research objectives and the summary clear" (Alhojailan, 2012, p. 39). The thematic analysis to be used in this dissertation is directed towards identifying the link that exists between the current literature on the inquiry-based method of learning and the construction of a creative learning environment capable of stimulating the students at primary school level. In recent times, there has been an attempt to reconfigure the concept of thematic analysis in accordance with the notion of "salience." Buetow argues that the, "thematic analysis is characteristic of most qualitative research. Themes are groups of codes that recur through being similar or connected to each other in a patterned way. Thematic analysis ignores codes that do not recur yet may nonetheless be important" (Buetow, 2010, p. 123). The writing of this dissertation is informed by the willingness to determine the salience of the concepts of creativity and motivations as elements that underscore the successful implementation of inquiry-based pedagogical methods in the classroom environment. The main objective behind

the use of thematic analysis is the visualisation of the data that emerges from the literature in a manner that enables researchers to understand the patterns that emerge from the data that emerges from the investigation of a particular subject. Attride-Stirling argues that, “thematic analyses can be usefully aided by and presented as thematic networks. Thematic networks are web-like illustrations that summarize the main themes constituting a piece of text. The thematic networks technique is a robust and highly sensitive tool for the systematization and presentation of qualitative analyses” (Attride-Stirling, 2001, p. 385). The thematic analysis method of research aims to create a layout of the data that enables scholars to know which are the factors that are relevant to the subject matter under investigation. Vaismoradi, Jones, Turunen and Snelgrove argue that the elucidation of the different themes that transpire from the investigation of a particular subject matter have as the “central issue...the research participants’ subjective meanings and social reality, [which] are appropriately conveyed in the research report. Data are not simply containers of meaning. A text may involve multiple meanings and their identification requires researcher’s efforts in the process of analysis. Meanings are conveyed in terms of themes and their related subdivisions as subthemes, though some variations are available in the use of the terms of “category” and “theme” (Vaismoradi, Jones, Turunen and Snelgrove, 2016, p. 110). This situation indicates that the use of a thematic approach in the analysis of the literature pertaining to the inquiry-based method of inquiry and its connection to the promotion of a creative learning environment capable of stimulating the learners is a complex and multi-faceted one. It is expected that the findings of the study will show, with some degree of certainty, that there are significant advantages derived from the use of the inquiry-based method of learning in primary education; this is particularly true if there is a consistent approach based on an innovative orientation and if the teaching professionals are able to motivate the students in the right manner (Gerlach and Bieger, 1996, p. 102). It is also expected that the success of this method of learning will be linked to the creation of a stimulating educational environment. The effective implementation of the inquiry-based of learning has the potential to establish a classroom environment that fosters creativity and allows the learners to assimilate knowledge in a playful manner (Johnson and Christensen, 2016, p. 140).

Chapter Four-The factors involved in the creation of a successful learning environment based on the use of the inquiry-based method

4.1 Introduction

This section of the dissertation tackles the factors involved in the creation of a successful learning environment based on the use of the inquiry-based method, giving special attention three interlinked factors; namely, (1) the use of technology in the classroom environment; (2) the push and pull between teacher and student oriented practices and (3) the influence of the social interaction between students, parents and teachers. This chapter of the dissertation considers the main ways in which the interaction between these three factors is responsible for fostering the conditions that enable learners to take full advantage of a stimulating learning environment.

4.2 The use of technology in the classroom environment

Technological advancement has created new opportunities for fomenting the acquisition of knowledge amongst primary school students. The early implementation of technology has the potential to disseminate the use of the inquiry-based method of learning in an effective manner. The establishment of a successful learning environment appears to depend on the use of technological devices and programmes from an early age. Wang, Kinzie, McGuire and Pan state that, "instructional technologies should be used in early childhood inquiry education to (a) enrich and provide structure for problem contexts, (b) facilitate resource utilization, and (c) support cognitive and metacognitive processes" (Wang, Kinzie, McGuire and Pan, 2010, p. 381). The use of technology in education helped students better understand the lessons. For example, substituting materials in PowerPoint form instead of traditional textbooks has a positive effect on the percentage of students

keeping their information in their memory. In order to test the effects of technology in improving the rates, extremely successful results were obtained. The use of technology has a high level of relevance in order to determine the shape of the learning environment. There is an element of playfulness that enables the student of primary school age to incorporate knowledge in a more personalised manner.

The scholarship points out that the use of technology facilitates the propagation of a Constructivist method of building knowledge, since it enables the learner to build a more subjective view of the subject matter that is being investigated (Johnson and Christensen, 2016, p. 146). Technological tools are able to promote creative learning environments in primary school settings, which enable the students to have a more personalised relationship with the knowledge that they are trying to assimilate. In this manner, technological devices and programmes promote a more subjective system of meaning attached to the process of learning. Technology allows students to work at the speed they want and according to their own characteristics. For example, most of the applications used allow for specific instructions. Thus, students have the opportunity to work according to their personal needs and abilities. Technology combined teaching methods give more time for teachers to work individually with students. The knowledge assimilated is, therefore, able to be used by the learner in extra-curricular situations in an effective way (Johnson and Christensen, 2016, p. 148).

In any case, it is important to take into consideration that the use of technological tools only benefits the learning environment they are successfully implemented by the educators in primary school settings. Groff and Mouza state that there are number of significant challenges pertaining to the use of technology in the classroom, including, “lack of concrete research and consensus among experts on the objectives and outcomes of technology integration into the school curriculum; assorted hardware and software available for school selection with unclear support on which meet a school’s needs; lack of teacher input on the development of innovations for instructional use; pressure and insufficient support (in the form of resources, time, professional development, and human and technological infrastructure) from the administration, community, and policy-makers to use the technology” (Groff and Mouza, 2008, p. 42). However, it has been shown that technological

devices and programmes enable learners of primary school age to establish a more personalised approach in the learning process. A proper use of technology empowers learners to shape their own view about the social reality that surrounds them, turning them into critical thinkers and stimulating the pursuit of knowledge in areas outside the curricular structure. Hopson, Simms and Knezek argue that, "exposure to technology and training in its use results in a more positive attitude relative to computer importance. Such a positive attitude indicates that once students are successful using technology and recognize the associated benefits, they will choose to continue using it as a learning tool. More positive attitudes toward motivation and creativity indicate that, when provided with technology, students are more likely to take control of their learning, stay focused until the task is complete, and pursue more obscure and hypothetical solutions to problems" (Hopson, Simms and Knezek, 2001, p. 117). Paradoxically, the use of technology facilitates the extension of attention spans, hence providing the learner with the opportunity to focus more effectively in the task at hand and to assimilate knowledge in a manner that can be employed outside the classroom in a useful way. The scholarship also recognizes the high level of integration of technological devices and programmes into the mode of imparting knowledge in primary school settings. Baylor and Ritchie argue that, "technology integration was predicted by two variables: teacher openness to change and the percentage of technology activities with others. Technology integration refers to how transparently the technology was blended into the lesson, and whether it was used to convey content in ways not easily done without technology. In contrast to activities that automate direct instruction (for example, computerized drill and practice used in place of pencil-and-paper tests), integrative lessons often provide students with greater challenge in the form of research, exploration, or expression" (Baylor and Ritchie, 2002, p. 410). It is important to highlight that this alternative way of approaching the symbiotic relationship that takes place between the educator and the learner in the primary school setting, which unfolds as a collaborative endeavour, provides the students with the opportunity to build a deeper sense of meaning about the knowledge that they are exposed to. The scholarship also recognizes that the successful integration of technology into the classroom may only be achieved by training educators in a proper manner. Vannatta and Nancy argue that, "as the role of technology in society and education dynamically emerges, the adequate preparation of teachers in educational technology is integral

to using such a tool effectively in the teaching and learning of our children...Only in the hands of innovative, informed, and committed professionals in supportive educational cultures can technology serve as a medium for helping children advance confidently into the future” (Vannatta and Nancy, 2004, p. 263). There seems to be a significant link between the use of technology and the creation of stimulating learning environments that are based on the inquiry-based method of learning. It is worth noting that this link is underscored by the opportunities presented to the learner when it comes to assimilating knowledge in a manner that enhances her or his range of skills and promotes her or his personal growth (Maor and Fraser, 1996, p. 405). At the same time, it should be noted that technology is to be used by the actors involved in the learning process as a *means* of the learning process. In other words, the creative process is ultimately the result of the efforts instigated by the educators and the learners in order to assimilate knowledge in a stimulating and useful manner. Technology can foster those conditions; particularly if it is properly directed towards improving the way in which the subject matter is investigated (Johnson and Christensen, 2016, p. 155).

4.3 The push and pull between teacher and student-oriented practices

The establishment of a creative learning environment also depends on the possibility of promoting practices that are conducive to the effective assimilation of new knowledge on the part of students of primary school age. There has been a lively debate regarding the benefits of the student-oriented and teacher-led practices. Teacher-led practices entail that the main focus of attention of the student is on the teacher. The teacher is very much in charge of imparting knowledge in the classroom (Peters, Cowie and Menter, 2017, p. 138). At the same time, the process of assimilation of new knowledge is undertaken in an isolated manner (Danielson, 2008, p. 45). The activities in which the students take part are carried out individually, with a very little level of collaboration amongst them (Peters, Cowie and Menter, 2017, p. 139). There are a number of advantages presented to teachers in this kind of learning environment. To begin with, the classroom appears to

remain more orderly, with a much higher level of student attention and a broader degree of control by the teacher (Peters, Cowie and Menter, 2017, p. 140). This does not mean that the student does not have any control on the process of knowledge assimilation. Working in relative isolation could entail that the student will be compelled, at least to a significant extent, to assimilate the knowledge that has been imparted by the teacher. In addition to this, teacher-led practice means that the educator is able to ascertain that all the topics that are relevant to the subject matter under investigation are properly covered in the classroom (Danielson, 2008, p. 49). In this manner, teacher-led practice can also promote, in an indirect manner, leadership mechanisms that can enhance the learning environment. Tan, Ponnusamy, Hung and Tan argue that, "providing opportunities for teachers to exercise informal leadership beyond the boundary of school, paired with job-embedded collaboration, moves teachers toward leadership over time as they accumulate professional experience and increase self- efficacy" (Tan, Ponnusamy, Hung and Tan, 2017). Therefore, teacher-led practices might useful for the purposes of ensuring the attainment of well-defined outcomes within the learning process. There are also some disadvantages that are connected to teacher-led practices. For instance, the fact that children work in relatively isolation may mean that their communication skills may not be as developed as in the case of children that operate in more collaborative environments (Danielson, 2008, p. 54). Furthermore, it has been found that this type of teaching practice may actually be detrimental for the purposes of stimulating students of primary school age. Boredom tends to set in more easily in situations that involve the frontal approach to learning promoted by teacher-led practices. There is also the danger that the students might not be able to have any influence on the way in which knowledge on a particular subject matter is assimilated, since there is less room for expressing themselves and communicating with the teacher and other students (Danielson, 2008, p. 57).

Student-oriented teaching practices are quite different from teacher-led method. This approach involves a more interactive way of focusing on the topics that are being learned. The focus of attention is not necessarily on the teacher. Instead, the focus of attention is being shared between the student and the educator (Bevan and Penuel, 2017, p. 81). There are a

number of significant advantages involved in this method of learning. To begin with, the students are able to learn important communicative and collaborative skills during the learning process. Additionally, since the students have more leeway to enquire about the subject matter under study, they are able to raise questions that may have the ultimate effect of enhancing the learning process; which, overall, appears to be more active and livelier (Bevan and Penuel, 2017, p. 84). This also means that the teacher has a lesser degree of control over the classroom, since the students' focus might be on deploying interactive ways of investigating the topic under study. Students who use self-centered teaching strategies to develop their confidence. Primary school students using self-centered teaching strategies should be helped to develop their confidence, to gain thinking skills to gain thinking skills, to think learn to express, to be tolerant and respectful to different ideas. In student-centered methods, students produce knowledge in prepared learning environments. They ask questions to the teacher and they get help from him, but these are questions that arise in the student's own needs. The position of the teacher is to answer the questions asked, and to guide them if they encounter a difficulty. Taking active participation of students in the courses has a significant impact in their understanding and questioning of what they have learned. Therefore, from formal to tertiary education take responsibility in all levels of education (Korkmaz, 2007). This assessment is important to ensure the educational requirements educational requirements of the age. In their study, Felder and Brent (1996) states that student-centered teaching increases the motivation of primary school students. In addition to that their level of understanding and recalling of knowledge increase also. In related research, it is concluded that, primary school students prefer student-centered learning. Because, in this way the student's demand are met more (Peke, 1993; Felder and Brent, 1996; Lea, Stehanson and Tray, 2003). One of the disadvantages that have been highlighted is that the classroom might be unruly and, oftentimes, chaotic. This could also mean that certain students would not be able to assimilate the subject under study in a proper manner (Borich, 2010, p. 142). Since the teacher is not in full control of the learning process, some students might feel relegated, for not being able to assimilate the topics that are being studied. Most importantly, the student-led teaching practice may also create problems for students who prefer to work by themselves. The emphasis on collaboration is not necessarily conducive to enhance the learning environment for *all* students (Borich, 2010, p. 144). There

are, therefore, a number of important factors that need to be taken into consideration when implementing a decision regarding the most effective method to be used in order to foster creative learning environment. The inquiry-based method of learning requires a certain degree of flexibility regarding the teaching practice that need to be applied for the purposes of constructing a creative and stimulating learning environment. There is a segment of the scholarship that endorses the view that, "student-oriented learning environments are perceived to be more interesting, enjoyable and valuable than teacher-centred approaches. Although the students actually learnt less in terms of a short-term learning effect, an introduction into the 'new' learning approach leads to similar long-term learning outcomes as it does the traditional approach. Hence, it is worthwhile to include student-oriented approaches and open learning environments in the curriculum" (Sturm and Bogner, 2008, p. 947). In essence, in spite of the practical problems that may arise from its implementation, there seems to be a consensus about the fact that a student-led teaching practice may foster the right conditions for the implementation of an inquiry-based method of learning that can lead to a creative and lively classroom environment. Azrin, Azrin and Armstrong state that, "the distinctive aspect of [student-led teaching practice] is the treatment of the student as a partner with the teacher, jointly establishing standards and privileges and jointly revising them on a structured daily basis in accord with their different and changing desires and experiences" (Azrin, Azrin and Armstrong, 1977, p. 203). Empowering students at primary school age to become independent learners allows them to assimilate knowledge in an innovative and fun way. However, it is important that this is done by taking into consideration the individual needs of the students; which means that, if needed, there should be an element of teaching-oriented practice that should be incorporated into the classroom.

4.4 The influence of the social interaction between students, parents and teachers

The possibility of constructing a creative learning environment using an inquiry-based method of learning is also influenced by the establishment of a considerable degree of positive social interaction between students, parents and teachers. One of the most significant implications that stem from this interaction is the reinforcement of the motivational stance that is

usually vital for establishing a stimulating learning environment. Wentzel argues that, "relations of perceived support from parents, teachers, and peers to student motivation differed depending on the source of support and motivational outcome: Peer support was a positive predictor of prosocial goal pursuit, teacher support was a positive predictor of both types of interest and of social responsibility goal pursuit, and parent support was a positive predictor of school-related interest and goal orientations (Wentzel, 1998, p. 202). A positive motivational stance is established when all the actors with a stake in the learning process work in order to prevent the onset of the emotional distress that may occur as a result of the burden that may be placed on students that are not comfortable with undertaking a more independent approach to learning. In this context, it is possible to underline that a proper interaction between parents, students and teachers also involves the identification of the potential problems that arise during the learning process and the implementation of mechanisms aimed at ensuring that students are not relegated in the classroom environment that promotes an inquiry-based method of learning. The scholarship recognises the importance of an effective support network, to ensure the success of the application of an inquiry-based method of learning. Newman argues that, "an important way in which elementary...students regulate their own learning and intellectual development is by obtaining assistance from others at times of need" (Newman, 2000, p. 350). This means the implementation of mechanisms that provide for the indirect but effective participation of teachers and parents when it comes to the process of monitoring the progress made by the student (Amabile, 1996, p. 118). This situation also entails that the tools and activities to be used in the classroom will have to undergo a permanent process of recalibration, in order to ensure that no student is left behind. Newman adds that, "at school, a child who engages in adaptive help seeking monitors his or her academic performance, shows awareness of difficulty he or she cannot overcome independently, and remedies that difficulty by requesting assistance from...parents, teachers, and peers" (Newman, 2000, p. 350). The feedback provided by the interaction between teachers, parents and students is crucial in making sure that the children of primary school age are able to adapt to the different challenges presented by the inquiry-based method of learning. This feedback also allows them to engage in the process of assimilating knowledge in a constructive manner. The inquiry-based method of learning may pose some difficulties for students that are not accustomed or willing to learn in a more independent

way. This is why it is so important to keep an open perspective about the tools that are needed in order to apply the inquiry-based of learning in a successful way (Azrin, Azrin and Armstrong, 1977, p. 204). The issue of adaptation is inextricably connected to the possibility that the student might seek help if s/he is not comfortable with a particular activity that unfolds in the classroom or if s/he is not able to work independently and/or in collaboration with other students. The process of adaptation may involve an element of teacher-led corrective practice, in order to ensure that all students are able to fully capitalise on the advantages of the inquiry-based method of learning (Azrin, Azrin and Armstrong, 1977, p. 206). *A priori*, it may seem that a great deal of effort is asked from the children of primary school age that are exposed to the inquiry-based method of learning. A more proactive attitude in regards to the learning process necessitates, perforce, the collaboration of parents, teachers and students. An interactive collaboration between all the actors involved in the learning process has the potential to ensure that children of primary school age are able to enjoy the learning process and build their identities in a healthy manner (Baylor and Ritchie, 2002, p. 399).

Deci, Vallerand, Pelletier and Ryan argue that the collaborative stance between parents, teachers and students in the context of an inquiry-based method of learning "is concerned primarily with promoting in students an interest in learning, a valuing of education, and a confidence in their own capacities and attributes. These outcomes are manifestations of being intrinsically motivated and internalizing values and regulatory processes (Deci, Vallerand, Pelletier and Ryan, 1991, p. 325). The most crucial factor that should be involved in the collaborative approach between parents, teachers and students is that children of primary school age are able to enjoy the exposure to a creative learning environment (Baylor and Ritchie, 2002, p. 400). This means that they will be able to take advantage of an effective process of learning, which will ultimately result in personal growth and the successful adaptation to the social world that surrounds them (Baylor and Ritchie, 2002, p. 401). There is a Constructivist perspective attached to the social interaction between teachers, parents and students that is based on the motivational orientation that is necessary in order to build knowledge that can be useful in extracurricular situations (Deci, Vallerand, Pelletier and Ryan, 1991, p. 325). This theory enables the student to participate in or outside the classroom

actively. It requires. The student in the learning process recognizes the importance of participating in the process of giving. Individual learning from the experience and knowledge through mutual speech and reflection share new information by sharing (Akar & Yıldırım, 2004). Obtaining information is not a result, but it is the source. Such a learning process in traditional classroom settings also cannot be realized. Everyone means its own internal in his works, his experiences, observations and logical constructs the interaction of thinking processes. Learning is a social process as well as cognitive. Three important conditions are required for constructivist learning to occur. The first condition is in the interaction with the environment. It is realized. The second condition is the cognitive contradiction that stimulates learning. The existence of cognitive contradiction is to seek the nature of knowledge to be learned. The third condition is information, social interaction and individual interpretation. In constructivist learning theory, the individual questioning, critical thinking, problem-solving and entrepreneurship are the forefront. (Brook & Brooks, 1993, Marlowe & amp; Page, 1998). Classroom environment, student's autonomy, and encouragement is a flexible and free place that allows it to form. In Constructivism learners form their knowledge structures. Therefore, the teacher should understand children's cognitive structures and the relationships between them (Von Glasersfeld, 1993). Learning is learned while learning. Learning is an active process of cognitive structure. (Driver, 1988; Noddings, 1990; Yaşar, 1998; Smith ve Ragan, 1999; Kılıç, 2001; Saban, 2002; Özden, 2003). Active learning is a product of the constructivist approach (Açıkgöz, 2002). The learner and the teacher are supposed to participate actively. Learning process starts with being structured on basic concepts. The problems, theories, and results of the subject are discussed. Therefore, in the process of configuring the information, it is necessary for learners to be provided an environment where they can have adequate experiences. Experiences should be meaningful for learners. The examples should be given from daily life. In that atmosphere, learners should be able to create different cognitive structures, and those should be accepted. They must be given the opportunity to present and defend their perspectives (Durmuş, 2001). In a learning environment supportive, router key phrases should be used, such as; of-ten "analyze!", "classify!", "guess!", "discover!", "produce!". Multidimensional communication has a valuable place in the learning process. Learners first discuss their thoughts in small groups, and they must conclude. Then they must conclude with the whole class by exchanging ideas.

Finally, the teacher must create an environment to compare the opinion of the class with the scientific opinions (Lorsh-bach & Tobin, 1997). Interactions within the group, sharing and collaborations are improving your understanding of learners. The learning process is related to active participation, cooperation, individuality, pluralist perspectives, how they are reflected in thinking and productivity. These activities are based on cognitive skills. Requires you to use. In constructivism, learning is done with existing situations and activities. In this process, the knowledge is not taken directly by the learner, but the transference of the information, the meaning of how the individual makes the meaning of knowledge. A constructivist education environment is a place where information is transferred, where inquiry, research, thinking, problem-solving and learning skills are developed. Drama, project work, teaching-learning, collaborative learning are the most commonly used strategies. The inquiry-based method of learning requires a higher level of independence on the part of the student. Therefore, its effective implementation depends on ensuring that all the relevant actors involved in the learning process operate in agreement with each other. In other words, the motivational stance that is attached to the inquiry-based method of learning depends on the support given by parents outside the classroom structure. Furthermore, curiosity for learning needs to be transferred to the home environment and to other social areas outside the school setting (Deci, Vallerand, Pelletier and Ryan, 1991, p. 329). These are important considerations in order to evaluate the best way in which the interaction between parents, teachers and students can enhance the successful application of the inquiry-based of learning.

4.5 Conclusion

In the above section, we were able to identify three different factors that affect the successful implementation of the inquiry-based method of learning. The use of technology in the classroom environment has the potential to ensure that children of primary school age are able to enjoy the collaborative and independent stance promoted by the inquiry-based method of

learning. Moreover, the use of technology is also geared towards ensuring that the students assimilate the knowledge that relates to the subject matter that is being investigated in the classroom in an effective manner (Deci, Vallerand, Pelletier and Ryan, 1991, p. 331). The successful implementation of the inquiry-based method of learning also depends on making sure that the activities that take place in the classroom have a distinct student-oriented approach. Nevertheless, it is also important that there are teacher-led remedial mechanisms aimed at ensuring that all students are able to take full advantage of the inquiry-based method of learning (Azrin, Azrin and Armstrong, 1977, p. 209). Finally, it is also important to underline the positive influence provided by the social interaction between students, parents and teachers when it comes to monitoring the progress made by children of primary school age that are exposed to the inquiry-based method of learning.

Chapter Five- A thematic discussion on the issues affecting the creation of a learning environment based on the use of the inquiry-based method

5.1 Introduction

This section of the dissertation will discuss two themes arising from the use of the inquiry-based method of learning. The first theme to be examined in this section of the dissertation is the link between creative classroom environments and the inquiry-based method of learning. This part of the chapter examines the technical aspects involved in the creation of a classroom environment conducive to fomenting an interactive and collaborative approach to learning amongst students of primary school age. The second part of this chapter will deal with the connotations of the link between student-oriented practice and the inquiry-based method of learning, as it concerns the motivational stance of students.

5.2 The link between creative classroom environments and the inquiry-based method of learning One of the most significant aspects that underpin the importance of inquiry-based method of learning is that it has the potential to enhance

the creative skills of the students of primary school age. The human brain has the capacity to think in an abstract manner.

The human brain, particularly at an earlier stage of development, has an enormous capacity to absorb new ideas and concepts, particularly as they relate to problem solving and language acquisition (Pink, 2009, p. 33). The link between creative classroom environments and the inquiry-based method of learning has been consolidated due to the advances made in the research made in the field of brain physiology (Azrin, Azrin and Armstrong, 1977, p. 211). There is a growing tendency to move away from a learning environment that prioritises content and knowledge; and a preference to introduce an inquiry-based method of learning that takes better care of the personalised needs of the student, fomenting investigative skills and critical analysis of the knowledge that the learner is being exposed to (Pink, 2009, p. 36).

The inquiry-based method of learning has been proven very successful in order to establish a creative learning environment. The engagement of the student with real-life practical problem solving exercises leads to the abandonment of rote memorisation and content-based learning as tools that are applied in the learning environment (Azrin, Azrin and Armstrong, 1977, p. 213). It has been found that, "the inquiry-based method of learning is able to establish a classroom environment which enhances creativity provides students with choices, accepts different ideas, boosts self-confidence, and focuses on students' strengths and interests. On the other hand, in an environment which inhibits creativity, ideas are ignored, teachers are controlling, and excessive structure exists" (De Souza, 2000, p. 148). The establishment of a creative learning environment has the potential to be a useful mechanism to gear students towards being able to take advantage of the opportunities presented by the new Industrial Revolution that is taking place worldwide. There are a number of ways in which the classroom environment can be reconfigured for the purposes of fostering creativity with the context of an inquiry-based method of learning (Warner and Myers, 2009, p. 28). To begin with, there needs to be a preference for lighting that does not allow students to become hyperactive, as it is the case of fluorescent lights. It has been found that this situational context is able to provide a good alternative to improve performance and to prevent the students from becoming fatigued. In addition to this, it has been found that the strategic deployment of colour within the classroom has the potential to create

a stimulating ambiance that is conducive to inquisitive learning (Thompson, 2003). It has also been found that the use of stimulating decoration and furniture arrangement within the classroom can also enhance the cognitive skills of the students. It is also important that the classroom can be equipped with resources that the students can use in a readily-available fashion; specially those that can inspire the will to get hand-on experience with new technologies as well as manual work (Kelly, 2001, p. 130). The establishment of a creative learning environment that facilitates the application of an inquiry-based method of learning can also be propitiated by classrooms that are well oxygenated in order to prevent fatigue and boredom amongst learners of primary school age. It has also been found that music can also help, in some instances, to enhance the cognitive conditions of the student and to propagate learning methods based on inquiry and discovery (Kelly, 2001, p. 138). Furthermore, creativity in the classroom is enhanced by spatial configurations that facilitate communication between the teachers and the pupils. The literature has highlighted the convenience of having classrooms that have high ceilings and that are arranged in order to enhance mobility and flexibility in the learning practice. Finally, class sizes need to be relatively small in order to foster creativity within the context of an inquiry-based learning environment. These are important technical considerations that facilitate the entrenchment of an educational perspective based on the discovery of knowledge as an act of co-creation, allowing the student to learn at her and his own pace and assimilating the knowledge gained in a useful manner (Amabile, 1996, p. 120). There are, in this context, three questions that need to be asked by teaching practitioners when establishing the conditions for creative classroom environments that propagate the inquiry-based method of learning:

"Why do we expect our students to be creative in environments that we, as adults, would never tolerate? ; Why are we still building schools and outfitting classrooms that look like industrial warehouses when the literature and research, for quite some time, has been telling us how to make creative spaces in educational settings? ; Does technology education truly embrace creativity in its curricula and its classrooms and lab facilities?" (Warner and Myers, 2009, p. 34).

There is an intricate connection between the establishment of a creative classroom and the dissemination of an inquiry-based method of learning. There are philosophical and spatial considerations that need to be taken into account when working towards strengthening the link between the creation of a creative classroom and the propagation of the inquiry-based method of learning. However, the effective use of this connection has the potential to enhance the cognitive and intellectual abilities of students of primary school age and provide them with the necessary tools to thrive in extra-curricular situations (Slavin, 2018, p. 180). It is the role of the educator to ensure that the knowledge assimilated in the classroom environment has the potential to become an instrument for personal growth for all the learners exposed to the inquiry-based method of learning (Warner and Myers, 2009, p. 36).

5.3 The connection between the inquiry-based method of learning and a student-oriented motivational stance

The second theme that emerges from the examination of the effects of the creation of a learning environment based on the use of the inquiry-based method is that the connection between the two tends to be underpinned by the importance of a student-oriented motivational stance (Bloom, 1982, p. 89). One of the most significant implications attached to the use of traditional methods of learning is that they make the student more reluctant to express their views regarding the subjects that are being learned (Deci, Vallerand, Pelletier and Ryan, 1991, p. 327). This can have negative externalities when it comes to the level of motivation that is necessary in order to assimilate the concepts derived from the subject matter under study (Bloom, 1982, p. 93). One of the important issues that explain why the learning process might not be guided by a high level of motivation is that, to a large extent, schools continue to be guided by a teacher-driven philosophy that hinders the sense of curiosity amongst students (Pink, 2009, p. 51). There is, hence, a crucial link that can be established between a student-driven approach and the inducement of a high degree of motivation. It has been found that the connection between an inquiry-based method of learning and a student-oriented motivational stance has the potential to enable children at

primary school level to enhance their critical skills and to communicate in an efficient manner (Silva, 2008, p. 150). The relevance of this link is of paramount importance for the purposes of constructing a classroom environment that allows the children of primary school age to assimilate the knowledge that will be necessary for developing skills that will enable them to thrive in the world of work (Silva, 2008, p. 155). The level of innovation, flexibility and creativity that will be required in order to join the world of work in the future will necessitate a high degree of motivation and personal responsibility, which can only be achieved through the use of a student-based method of learning. The learning outcomes that are generated in the school system unfold in accordance with the level of ability of the student and the environment that is created in the classroom. As far as the learning environment is concerned, there is an inextricable connection between the level of performance and the degree of motivation of the student (Silva, 2008, p. 163). The scholarship on the value of motivation in the learning environment shows that "self-regulation" is a crucial aspect when improving performance and outcomes. Zimmerman states that, "self-regulation is not a mental ability or an academic performance skill; rather it is the self-directive process by which learners transform their mental abilities into academic skills" (Zimmerman, 2002, p. 65). From this assumption, one can argue that motivation is connected to the possibility of ensuring that the knowledge gained by the student has a practical use. Zimmerman states that, "learning is viewed as an activity that students do for themselves in a proactive way rather than as a covert event that happens to them in reaction to teaching. Self-regulation refers to self-generated thoughts, feelings, and behaviors that are oriented to attaining goals" (Zimmerman, 2002, p. 65). The possibility of having a high level of motivation is therefore connected to the establishment of a learning environment that promotes an independent attitude on the part of the students. The inquiry-based method has the potential to improve performance and learning outcomes because it allows students the freedom to investigate in a critical manner the best way to solve the problems that are presented to them. In this context, the students feel empowered to take charge of their own learning process and make full use of the opportunities that exist for its implementation in extra-curricular settings (Slavin, 2018, p. 163).

The literature also finds that the impact of the inquiry-based method of learning may vary according to the way in which the students are evaluated. Meece, Anderman and Anderman state that, "students show the most positive motivation and learning patterns when their school settings emphasize mastery, understanding, and improving skills and knowledge" (Meece, Anderman and Anderman, 2006, p. 487). Here we see the way in which an independent approach to learning, based on the needs and interests of the student, may be conducive to increase motivation. Meece, Anderman and Anderman also argue that, "whereas school environments that are focused on demonstrating high ability and competing for grades can increase the academic performance of some students, research suggests that many young people experience diminished motivation under these conditions (Meece, Anderman and Anderman, 2006, p. 487). There is an assiduous connection between the motivational stance exhibited by the students who are exposed to the inquiry-based method of learning and the outcomes that are achieved in the classroom. Therefore, the role of the teacher is based on the necessity to ensure that the focus attention remains on the learning objective that needs to be attained. Ames, and Archer state that, "the motivation patterns of these high-achieving students were responsive to the perceived goal orientation of the classroom is particularly noteworthy. Moreover, even in this restricted range of ability, students' self-perceptions of ability were found to vary considerably and mediate motivated cognitions...Goal orientation, therefore, is determined by what is actually happening in the classroom, but, more important, it is defined by how the individual student gives meaning to these events and what motivational orientation he or she adopts" (Ames, and Archer, 1988, p. 265). Therefore, it is possible to argue that the effective implementation of the inquiry-based method of learning depends, by and large, on the particular stance adopted by each students and in the capacity of the learner to make qualitative changes that enable him or her to adapt to a more collaborative and interactive ways of learning (Ames, 1992, p. 268). Therefore, it is possible to argue that the implementation of the inquiry-based method of learning should be seen as a process instead as a tool that can be applied in the classroom in one go. The learners in primary school settings need time to adapt to the conditions that are needed in order to take full advantage of the inquiry-based method of learning (Azrin, Azrin and Armstrong, 1977, p. 212).

5.4 Conclusion

As we were able to see above, there are two main themes that transpire from the examination of the use of the inquiry-based method of learning at primary school level. To begin with, it is important to highlight the significance of the link between fostering of the inquiry-based method of learning and the establishment of a creative classroom environment. This link has important Constructivist connotations, as it is underscored by the element of personal growth and the ability to reinforce a personalised way of assimilating knowledge. In addition to this, this chapter has shown the implications of the connection between student-oriented practice and the inquiry-based method of learning, as it concerns the motivational stance of students of primary school age (Slavin, 2018, p. 170). A strong motivational stance has the potential to ensure that the inquiry-based method of learning redounds to the benefit of all students and that is able to promote the effective assimilation of knowledge (Azrin, Azrin and Armstrong, 1977, p. 213).

Chapter Six-Conclusion

There are a number of conclusions that can be drawn in regards to the creation of an inspiring educational environment through the use of the inquiry-based method of learning. This study has demonstrated that the elements of creativity and motivation are vital in ensuring the success of the inquiry-based method at primary level. This study has highlighted the importance of several factors that facilitate the establishment of a creative classroom environment and a strong motivational stance on the part of the student. These include the effective use of technological methods in order to foster interest and active involvement in the subject matter that is investigated in the classroom by students of primary school age (Wang, Kinzie, McGuire and Pan, 2010, p. 383; Maor and Fraser, 1996, p. 402). Therefore, it is recommended that teachers, students and parents work together in order to find the best technological devices and programmes to disseminate the

inquiry-based method of learning in an effective manner. At the same time, the success of the inquiry-based method of learning is also underpinned by the incorporation of mechanisms that support the student-oriented approach (Groff and Mouza, 2008, p. 43). This study has highlighted the importance of maintaining a fruitful collaborative relationship between students, teachers and parents, for the purposes of ascertaining that no student feels relegated in the classroom and that they are in a position to benefit from an independent and collaborative approach to learning (Wentzel, 1998, p. 203). This study has shown that the inquiry-based method of learning is a successful instrument in the facilitation of a creative approach to learning, as it fosters critical and analytical thinking amongst students of primary school age (Newman, 2000, p. 352). The exposure of students to technology has been responsible for consolidating the shift away from a teacher-oriented approach and the emphasis on the memorisation of content (Hopson, Simms and Knezek, 2001, p. 119). It is recommended that students of primary school age are able to acquire knowledge for the purposes of attaining personal growth and for using it in practical situations outside the classroom (Baylor and Ritchie, 2002, p. 399). It is recommended that any teacher-oriented practices that might be needed to fill the gaps left by the collaborative and interactive approach emphasised by the inquiry-based method of learning needs to take into consideration the link that exists between creativity and motivation in the process of learning (Deci, Vallerand, Pelletier and Ryan, 1991, p. 329). There are a number of effective learning approaches that can be used to sustain the use of the inquiry-based method of learning for primary school students within the context of a creative learning environment (Ames, 1992, p. 263). A collaborative and independent stance on the part of the students can only lead to positive learning outcomes if it is supported by mechanisms that provide help to students that might, at any point, feel relegated in the classroom (Coffman, 2017, p. 150). There are, therefore, a number of important ways in which the inquiry-based method can enhance the learning process at primary school level.

Bibliography

Acikgoz, K. Ü. 2002. Aktif Öğrenme. İzmir: Eğitim Dünyası Yayınları.

Akınoğlu, O. 2004, Yapılandırmacı öğrenme ve coğrafya öğretimi.

Amabile, T. (1996) *Creativity in Context*, Harper Collins, Boulder, CO

Ames, C. 1992, "Classrooms: Goals, Structures, and Student Motivation", *Journal of Educational Psychology*, vol. 84, no. 3, pp. 261-271.

Ames, C., and Archer, J. 1988, "Achievement goals in the classroom: Students' learning strategies and motivation processes", *Journal of Educational Psychology*, vol. 80, no. 3, pp. 260-267

Akar, H. ve Yıldırım, A. 2004, "Oluşturmacı Öğretim Etkinliklerinin Sınıf Yönetimi Dersinde Kullanılması".

<http://www.erg.sabanciuniv.edu /iok2004>

Akkus, R., Gunel, M. and Hand, B., (2007) "Comparing an inquiry-based approach known as the Science Writing Heuristic to traditional science teaching practices: Are there differences?", *International Journal of Science Education*, vol. 29, no.4, pp. 1745-1765

Alhojailan, M. (2012, "Thematic analysis: A critical review of its process and evaluation", *West East Journal of Social Sciences*, vol. 1, Issue 1, pp. 39-47

Attride-Stirling, J. 2001 "Thematic networks: an analytic tool for qualitative research", *Qualitative Research*, vol.1, no. 3, pp. 385-405

Azrin, V., Azrin, N. and Armstrong, P. 1977, "The student oriented classroom: A method of improving student conduct and satisfaction", *Behavior Therapy*, vol. 8, pp. 193-204

Baylor, A. and Ritchie, D. 2002, "What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms?", *Computers and Education*, vol. 39, no. 4, pp. 395-414

- Berardi, V. and Blundell, G. 2014, " A learning theory conceptual foundation for using capture technology in teaching", *Information Systems Education Journal*, vol. 12, Issue 2, pp. 64- 73
- Bevan, B. and Penuel, W. 2017, " Connecting Research and Practice for Educational Improvement: Ethical and Equitable Approaches", Routledge, London
- Bhattacharjee, J. 2015, "Constructivist approach to learning—an effective approach of teaching learning", *International Research Journal of Interdisciplinary & Multidisciplinary Studies*, vol. 1, no. 4, pp. 23-28
- Bloom, B. 1982, " Human Characteristics and School Learning", McGraw-Hill Book Company, New York
- Borich, G. 2013, "Effective Teaching Methods: Research-Based Practice", Pearson, New York
- Braun, V., Clarke, V. and Terry, G. (2014) Thematic analysis, *Qualitative Research Clinical Health Psychology*, vol. 24, pp. 95-114
- Briggs, A., Coleman, M. and Morrison, M. (eds.) 2012, "Research Methods in Educational Leadership and Management", SAGE Publications Ltd., New York
- Brooks, J. G. & Brooks, M. G. 1993, "In Search For Understanding The Case For Constructivist Classrooms", Alexandria, Virginia: ASCD.
- Bryman, A. 2015, " Social Research Methods", Oxford University, Oxford
- Buetow, S., 2010, "Thematic analysis and its reconceptualization as 'saliency analysis", *Journal of Health Services Research and Policy*, 15(2), pp. 123-125
- Burden, P. and Byrd, D. 2012, "Methods for Effective Teaching: Meeting the Needs of All Students", Pearson, New York
- Coe, R., Waring, M., Hedges, L. and Arthur, J. (eds.) 2017, "Research Methods and Methodologies in Education", SAGE Publications Ltd., New York
- Coffman, T. 2017, "Inquiry-Based Learning", RLI, Lanham, MD

Coupal, L. 2004, "Constructivist learning theory and human capital theory: shifting political and educational frameworks for teachers' ICT professional development", *British Journal of Educational Technology*, vol. 35, no. 5, pp. 587-596

Creswell, J. 2004, "Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research", Prentice Hall, Upper Saddle River, NJ

Danielson, C. 2008, "The Handbook for Enhancing Professional Practice: Using the Framework for Teaching in Your School, Association for Supervision & Curriculum Development", Washington, DC

Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P. & Howe, A. 2013, "Creative learning environments in education—A systematic literature review", *Thinking Skills and Creativity*, vol. 8, pp. 80-91.

Deci, E., Vallerand, R., Pelletier, L. and Ryan, R. 1991, "Motivation and education: The self-determination perspective, *Educational Psychologist*", vol. 26 no.3-4, pp. 325-346

De Souza F. 2000, "Teacher and student perceptions of creativity in the classroom environment", *Roepers Review*, vol. 22 no. 3, pp. 148-153

Durmus, S. 2001, "Matematik Eğitime Oluşturmacı Yaklaşımlar", *Kuram ve Uygulamada Eğitim Bilimleri Dergisi.*, vol. 1 pp. .91-107.

Edmonds Alvarado, A. 2003, "Inquiry-Based Learning Using Everyday Objects: Hands-On Instructional Strategies That Promote Active Learning in Grades 3-8", Corwin, Thousand Oaks, CA.

Fleder, R. M. and Brent, R. 1996. "Navigating the Bumpy Road to Student-Centred Instruction". *College Teaching*, vol. 44 no. 2, pp. 43-47.

Gall, M., Gall, J. and Borg, W. 2006, "Educational Research: An Introduction", Pearson, New York

Grainger, Teresa and Barnes, Jonathan 2006, "Creativity in the primary curriculum. In: Arthur, James; Grainger, Teresa and Wray, David eds. *Learning to Teach in the Primary School*". London, UK: Routledge, pp. 209–225.

Gay, L., Mills, G. and Airasian, P. 2008, "Educational Research: Competencies for Analysis and Applications²", Prentice Hall, Upper Saddle River, NJ

- Gerlach, G. and Bieger, G. 1996, "Educational Research: A Practical Approach", Cengage Learning, New York
- Gormally, C., Brickman, P., Hallar, B. and Armstrong, N. 2009, "Effects of inquiry-based learning on students' science literacy skills and confidence", *International Journal for the Scholarship of Teaching and Learning*, vol. 3, Issue 2, pp. 1-22
- Groff, J., and Mouza, C. 2008, "A framework for addressing challenges to classroom technology use", *AACe Journal*, vol. 16, no.1, pp. 21-46
- Hopson, M. Simms, R. and Knezek, G. 2001, "Using a technology-enriched environment to improve higher-order thinking skills", *Journal of Research on Technology in Education*, vol. 34 no. 2, pp. 109-119
- Hwang, G.J., Chiu, L.Y. and Chen, C.H. 2015, "A contextual game-based learning approach to improving students' inquiry-based learning performance in social studies courses, *Computers & Education*, vol. 81, pp. 13-25
- Jaleel, S. and Verghis, A.M., 2015, "Knowledge creation in constructivist learning", *Universal Journal of Educational Research*, vol. 3no. 1, pp. 8-12
- Johnson, B. and Christensen, L. 2016 "Educational Research: Quantitative, Qualitative, and Mixed Approaches", *SAGE Publications*, New York
- Jonassen, D.H. and Rohrer-Murphy, L., 1999 "Activity theory as a framework for designing constructivist learning environments", *Educational Technology Research and Development*, vol. 47, Issue 1, pp. 61-79
- Kelly, T. 2001, "The art of innovation", Currency, New York
- Keys, C. and Bryan, L. 2001, "Co-constructing inquiry-based science with teachers: Essential research for lasting reform", *Journal of Research in Science Teaching*, vol. 38, Issue 6, pp. 631-646
- Kirschner, P.A., Sweller, J. and Clark, R. 2006, "Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching", *Educational Psychologist*, vol. 41 no. 2, pp. 75-86

- Korkmaz, İsa (2007). "Öğrenci Merkezli Ders Uygulamalarına İlişkin Öğrenci Görüşleri". *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, vol. 17, pp. 393-402. work, for example, related to science.
- Krathwohl, D. 2009, "Methods of Educational and Social Science Research: The Logic of Methods", Waveland Press Inc., Long Grove, IL.
- Lochmiller, C. and Lester, J. 2016, "An Introduction to Educational Research: Connecting Methods to Practice2", SAGE Publications, New York
- Lodico, M., Spaulding, D. and Voegtler, K. 2010, "Methods in Educational Research: From Theory to Practice," Jossey-Bass, New York
- Lorsbach, A. & Tobin, K. 1997, "Constructivism As A Referent For Science Teaching", <http://www.exploratorium.edu/IFI/resources/research/constructivism.html> [23 November 1999].
- Magnussen, L., Ishida, D. and Itano, J. (2000) "The impact of the use of inquiry-based learning as a teaching methodology on the development of critical thinking", *Journal of Nursing Education*, Volume 39, Issue 8, pp. 360-364
- Maor, D. and Fraser, B. 1996 "Use of classroom environment perceptions in evaluating inquiry-based computer-assisted learning", *International Journal of Science Education*, vol. 18, no. 4, pp. 401-421
- Maiers, A. and Sandvold, A. 2010, "The Passion-Driven Classroom: A Framework for Teaching & Learning", Routledge, London
- Meece, J. L., Anderman, E. M., and Anderman, L. H. 2006, "Classroom goal structure, student motivation, and academic achievement", *Annual Review Psychology*, vol. 57, pp. 487-503
- Murnane, R. and Willett, J. 2010, "Methods Matter: Improving Causal Inference in Educational and Social Science Research", Oxford University Press, Oxford
- Newman, R. 2000, "Social influences on the development of children's adaptive help seeking: The role of parents, teachers, and peers", *Developmental Review*, vol. 20, no. 3, pp. 350-404

- Peke, G. 1993. "Issues and Problem in Implementing Student-centered Learning With Adult". *Journal of Teacher Development*, vol. 2, pp. 46-52.
- Peters, M., Cowie, B. and Menter, I. 2017, "A Companion to Research in Teacher Education", Springer, New York
- Pink, D. 2009, "Drive: The surprising truth about what motivates us", Riverhead Books, New York, NY
- Reigeluth, C. 1999, "Instructional-design theories and models. A new paradigm of instructional theory", *Lawrence Erlbaum Associates, Inc.*, Mahwah, NJ
- Robin, B. 2008, "Digital storytelling: A powerful technology tool for the 21st century classroom, *Theory into Practice*", vol. 47, no. 3, pp. 220-228
- Shih, J., Chuang, C. and Hwang, G. 2010, "An inquiry-based mobile learning approach to enhancing social science learning effectiveness" *Journal of Educational Technology & Society*, vol. 3, no. 4, pp. 50-62
- Silva, E. 2008) "Measuring Skills for 21st Century", Education Sector, Washington D.C
- Slavin, R. 2018, "Educational Psychology: Theory and Practice", Pearson, New York
- Spector, J., Merrill, M. and Elen, J. (eds.) 2014, "Handbook of research on educational communications and technology" Springer, New York, NY.
- Stacey, S. 2018, "Inquiry-Based Early Learning Environments: Creating, Supporting, and Collaborating2, Redleaf Press, St. Paul, MN
- Sturm, H., and Bogner, F. X. 2008 "Student-oriented versus Teacher-centred: The effect of learning at workstations about birds and bird flight on cognitive achievement and motivation", *International Journal of Science Education*, vol. 30, no. 7, pp. 941-959
- Tan, L., Ponnusamy, L., Hung, D. and Tan, K. 2017 "A study on developing teacher leadership and engendering an emerging teacher-led culture" - https://repository.nie.edu.sg/bitstream/10497/19482/1/NIE_research_brief_17-002.pdf - Accessed on July 12, 2018.

Thompson, S. 2003 "Color in Education" -www2.peterli.com/spm/resources/articles/archive.php?article_id=551 –

Accessed on July 11, 2018

Tobin, K. & Tippins, D. 1993, "Constructivism As A Referent For Teaching And Learning" K. Tobin

(ed.) The practice of constructivism in science education pp. 3-22. Washington: AAA Press.

Vaismoradi, M., Jones, J., Turunen, H. and Snelgrove, S. 2016, " Theme development in qualitative content analysis and thematic analysis, *Journal of Nursing Education and Practice*, vol. 6, no. 5, pp.100-110

Vannatta, R. and Nancy, F. 2004, " Teacher dispositions as predictors of classroom technology use", *Journal of Research on Technology in Education*, vol. 36, no. 3, pp. 253-271.

Von-Glasersfeld, E. (1993). Questions And Answers About Radical Constructivism. Bulunduğu eser: K. tobin (ed.). The practice of constructivism in science education pp.23-38. Washington: AAA Press

Wallen, N. and Fraenkel, J. 2000, "Educational Research: A Guide To the Process," Routledge, London

Wang, F., Kinzie, M. B., McGuire, P., and Pan, E. 2010, "Applying technology to inquiry-based learning in early childhood education", *Early Childhood Education Journal*, vol. 37, no. 5, pp. 381– 389

Warner, S. and Myers, K. 2009, "The creative classroom: The role of space and place toward facilitating creativity", *Technology and Engineering Teacher* 69, no. 4, pp. 28-34

Watters, D. and Watters, J. 2007, " Approaches to Learning by Students in the Biological Sciences: Implications for Teaching", *International Journal of Science Education*, vol. 29, Issue 1, pp. 19-43

Wentzel, K. 1998, "Social relationships and motivation in middle school: The role of parents, teachers, and peers", *Journal of Educational Psychology*, vol. 90, no. 2, pp. 202-209

Yoon, H., Joung, Y. J. and Kim, M. 2012, "The challenges of science inquiry teaching for pre-service teachers in elementary classrooms: Difficulties on and under the scene", *Research in Science & Technological Education*, vol. 42, Issue 3, pp. 589–608.

Zimmerman, B. 2002, "Becoming a self-regulated learner: An overview, Theory Into Practice" ,vol. 41, no. 2, pp. 64–70

