

INTERNATIONAL BACCALAUREATE DIPLOMA PROGRAMME
TEACHERS' PRACTICES AND PERCEIVED SELF-EFFICACY REGARDING
THE DEVELOPMENT OF THEORY OF KNOWLEDGE STUDENTS' CRITICAL
THINKING

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International Baccalaureate Diploma Programme Teachers' Practices and Perceived
Self-Efficacy Regarding the Development of Theory of Knowledge Students'
Critical Thinking

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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum & Instruction.

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ABSTRACT

INTERNATIONAL BACCALAUREATE DIPLOMA PROGRAMME TEACHERS' PRACTICES AND PERCEIVED SELF-EFFICACY REGARDING THE DEVELOPMENT OF THEORY OF KNOWLEDGE STUDENTS' CRITICAL THINKING

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Master of Arts in Curriculum and Instruction

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January 2024

This present study investigated the Theory of Knowledge teachers' perceptions regarding the definition of critical thinking, implementation of critical thinking, and their perceived self-efficacy. A questionnaire was used to collect data from 77 Turkish and international teachers. Following the interviews, selected respondents agreed to be interviewed to provide further insights into the analysis. Correlational design was used to examine the relation between participants' perceived self-efficacy and a number of variables, including experience, subject area, and professional development. The results found significant relationships between the participants' perceptions of their self-efficacy and their education level and International Baccalaureate professional development. Furthermore, the study provides insights into teaching methods and resources teachers often use to support students' critical thinking during their Theory of Knowledge courses. In general, Theory of Knowledge teachers perceive critical thinking is integral to their course. Teachers' self-efficacy regarding developing students' critical thinking may be improved through targeted professional development courses.

Keywords: Critical thinking, Theory of knowledge, Self-efficacy, Practices for critical thinking

ÖZET

Uluslararası Bakalorya Diploma Programı Öğretmenlerinin Bilgi Kuramı Öğrencilerinin Eleştirel Düşünme Becerilerini Geliştirmelerine İlişkin Uygulamaları ve Algılanan Öz Yeterlikleri

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Bu çalışma, Bilgi Kuramı öğretmenlerinin eleştirel düşünme becerisi tanımını, eleştirel düşünme becerisinin uygulanmasını ve öz yeterliliklerine ilişkin algılarını araştırmıştır. Yetmiş yedi Türk ve uluslararası öğretmenden veri toplamak için bir anket kullanılmıştır. Anket sonrasında analize ilişkin daha fazla bilgi sağlamak üzere gönüllü katılımcılar ile takip görüşmeleri yapılmıştır. Katılımcıların algıladıkları öz-yeterlilik ile deneyim, konu alanı ve mesleki gelişim de dahil olmak üzere bir dizi değişken arasındaki ilişkiyi incelemek için ilişkisel tasarım kullanılmıştır. Sonuçlara göre katılımcıların öz yeterlilik algıları ve eğitim düzeyleri ile Uluslararası Bakalorya profesyonel gelişim eğitimlerine katılmaları arasında anlamlı ilişki bulunmuştur.

Ayrıca çalışma, öğretmenlerin Bilgi Kuramı dersleri sırasında öğrencilerin eleştirel düşünme becerilerini desteklemek için sıklıkla kullandıkları öğretim yöntemleri ve kaynaklara dair iç görü de sağlamaktadır. Genel olarak Bilgi Kuramı öğretmenleri eleştirel düşünme becerisini derslerinin ayrılmaz bir parçası olarak algılamışlardır. Öğretmenlerin, öğrencilerin eleştirel düşünme becerisini geliştirmeye yönelik öz yeterlikleri, hedeflenen mesleki gelişim kursları aracılığıyla geliştirilebilir olduğu sonucuna varılmıştır.

Anahtar kelimeler: Eleştirel düşünme, Bilgi kuramı, Öz yeterlilik, Eleştirel düşünme becerisi için uygulamalar

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CHAPTER 1: INTRODUCTION

In the 21st century, it is easy for people to access information from a variety of resources, especially from social media and the Internet. Many people can reach the Internet easily and fast, which provides them with many choices to learn about any topic. Although getting information through various platforms might be advantageous for individuals on several occasions, the accuracy and reliability of the resources can be controversial because the source of information may be untrustworthy. Among many ways of differentiating incorrect information, critical thinking is one of the best practices to distinguish between misleading and trustworthy resources of information. For this reason, many people, especially youngsters, need to learn to use their critical thinking skills to differentiate inaccurate or unassured information to gain a logical idea about a subject. Therefore, education plays a crucial role in helping people think critically. Most of all, critical thinking is needed in the contemporary world because, thanks to it, people can use their thinking skills, such as analysing a point from different perspectives, making logical explanations, or justifying their claims, which helps their development on several occasions.

Background

In the past, people read books, newspapers, or encyclopaedias to gain information because of the limited resources. However, many people are subject to a lot of information bombardment via numerous mediums in the modern world, which can lead to the spread of incorrect and misleading news. In this way, people can encounter numerous pieces of information regardless of their precision, which may

lead to spreading misinformation, believing in inaccurate information, and having false beliefs about a topic. According to Machete and Turpin (2020), the convenience of the Internet, social media, and technological tools increased the availability of information. The abundance of resources, especially on social media, might cause the distribution of fake news among people (Machete & Turpin, 2020). This situation might cause some problems, especially for young people who may be inexperienced at differentiating useful or misleading information from resources. One way to avoid inaccurate information is to think critically, which provides different perspectives by reasoning and analysing a point in every possible aspect.

The Definitions and Significance of Critical Thinking

Critical thinking (CT) is not a new concept. For thousands of years, famous philosophers have promoted CT for the sake of humanity. For instance, Socrates helped people think critically by asking questions to help them gain new perspectives. He supported the idea of thinking profoundly by asking questions and analysing arguments and beliefs before acknowledging an idea as accurate. The method he used to foster CT is called Socratic Questioning, which emphasises the necessity of CT for precision and reasonable correspondence (Paul et al., 1997). Socrates tried to create a considerable impact through Socratic Questioning, and his way of thinking still proves the importance of critical thinking, which means coming up with a judgment after listening and considering all parts of an issue, evaluating all the points, and concluding what is relevant or irrelevant (Facione, 2011).

Despite the accepted importance of CT, educators and researchers may not agree on its definition. According to Brookfield (2011), CT is an ability that provides multiple perspectives to the thinker, which means that a person is ready to discuss an issue and willing to change his or her mind when necessary. At first, a person needs

to be aware of the knowledge. After being aware of that knowledge, one can start questioning the trustworthiness of the knowledge. An individual should begin analysing, assessing, evaluating, and interpreting a point to have a reasonable argument after a deep investigation to think critically (Brookfield, 2011). As stated in the quotation, realising the existing knowledge, and knowing how to use it effectively by assessing, evaluating, and interpreting are the crucial factors of CT which help people reach a sensible opinion.

From the perspective of Ennis (1985), CT is a thoughtful and logical way of thinking that focuses on deciding what to believe or do. As Ennis suggests, CT, by definition, requires someone to analyse a point, look from a broad perspective, and reach a logical idea.

For Facione (1990), CT is “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based” (p. 3). Facione emphasises that CT has a purpose that leads to self-regulation besides the ability to interpret, analyse, evaluate, and make inferences by justifying arguments through evidence. His comprehensive definition also shows that CT is a skill with many components to think critically and inclusively.

In addition to these, Lipman (1988) believes that CT is adroit and responsible reasoning that promotes valuable sense as it is based on criteria, self-correcting, and sensitive in terms of context. Lipman also highlights that self-regulation, having a purpose, and being responsible for what you think are crucial components of CT.

Considering all of these definitions: reasoning, evaluating, being purposeful, making an inference, and self-correction or regulation are the keywords that these

philosophers highlight. Therefore, acquiring CT skills is significant in many ways for people since they provide people with many logical and purposeful ideas to come up with their own justifications and find their truth.

Teaching Critical Thinking and Its Benefits

There are several research that indicate the importance of teaching CT skills at schools since it is one of the most essential skills in the 21st century. In many international curricula, such as The International Baccalaureate Diploma Programme (IBDP), A level, International General Certificate of Secondary Education (IGCSE) and Advance Placement (AP), critical thinking holds a significant place, so their curricula, lesson content, assignments and exams are arranged accordingly. However, teaching and learning CT skills may not be so easy for teachers and students due to topics, teachers' lack of knowledge or self-efficacy and students' readiness. Furthermore, a well-developed curriculum, knowledgeable and professional educators and support from the administration are other important factors for teaching and learning CT. Most importantly, the process is very important in teaching and learning CT because CT should be taught clearly and developed over the procedure of the programme instead of one particular lesson or semester (Haber, 2020). For this purpose, a well-designed educational program that promotes CT skills has an appreciable place for parents, learners, educators, and educational institutions.

To understand how students master critical thinking, various researchers explored some important factors regarding CT, such as learning experiences, curriculum, and different pedagogical approaches. For instance, Raslan (2022) investigated the grade 12 AP students' CT levels in Chemistry lessons embedded with science practice and found that the science practice integrated course assisted

students' CT positively in AP chemistry lesson. Consequently, the students can construct sensible ideas and are able to see different perspectives on issues, which will help them be successful in the future by learning CT skills (Conger et al., 2023). Another study focused on learners' development in CT and contrasted the conventional approach and the guided inquiry model. Serenica et al. (2018) discovered that the guided inquiry model significantly had a positive impact on students acquiring CT. They uncovered that learners were engaged in the learning procedure, which comprised of offering solutions associated with environmental issues; therefore, students grasped CT incrementally (Serenica et al., 2018). Therefore, students' active participation in the learning process is essential in CT so that they could understand and internalize how to provide solutions for problems and gain awareness of a global issue, which can make them caring people as well. In addition to these, Raslan (2022) researched cooperative learning, which also developed CT. He found that when students worked collaboratively, they learned about the subject details and accomplished regular learning objectives. Although cooperative learning required strong teacher management, it helped students gain knowledge through discussions and brainstorming so that they could learn thoroughly and in-depth. In that way, students developed CT through discussions and acquiring knowledge rather than memorising it. Furthermore, Najah and Setiati (2020) investigated the implementation of the Cambridge International Curriculum (CIC) because they aimed to understand if CIC promoted CT. Students explained the various components of CT they learned, such as actively engaging in group discussions, communicating well with others, critiquing ideas with justifications, inferencing, self-regulation and making explanations. Consequently, they concluded that CIC had a considerable influence on students' CT, which indicated that they

were getting prepared for the 21st century requirements. In addition to this research, Hill and Saxton (2014) examined the core components of the IB programme and reviewed what the necessary skills were for the future that previous reliable reports recognised. They ascertained that the vital skills for the 21st century were in line with the outcomes of the IB programmes. Their study revealed that the IB graduates did very well in tertiary education, and they contributed to the universities' reputation positively. The IB programmes embedded the necessary skills such as critical thinking, being ethical when making decisions, and being confident and caring; therefore, the IB programmes raise well-educated and visionary people who are willing to create a better world (Hill & Saxton, 2014).

All things considered, CT in education has always been important as one of the aims of education should be to raise independent thinkers and conscious members who help society's prosperity. As a result, many schools and teachers implement CT into the lessons via various methods, as it is a significant skill that people need to use to succeed in a competitive world. Many education programs have courses and curricula designed to foster CT. The current study focuses on one program, the International Baccalaureate Diploma Programme (IBDP), provided through the International Baccalaureate (IB), which intends to develop responsible, knowledgeable, and responsible citizens via its education philosophy.

What is the International Baccalaureate Diploma Programme?

The International Baccalaureate Diploma Programme was established in the 1960s, and its aim was to bring a new and progressive perspective to the traditional type of education. Through the years, the International Baccalaureate programmes have been expanded and divided into four categories. The Primary Years Programme (PYP) (ages 3-11), the Middle Years Programme (MYP) (ages 11-16), the Diploma

Programme (DP) (ages 16-19), and the Career-Related Programme (CP) (ages 16-19) comprise the International Baccalaureate Programme (IB, 2019).

The IBDP aims to raise questioning, knowledgeable, self-assured, and conscientious individuals who can construct mutual understanding and respect worldwide. Moreover, the IBDP intends to produce self-learners who can take responsibility for their learning and gain the necessary skills to create a better world for the future. The IB learners should have many positive skills, such as being inquirers, knowledgeable thinkers, communicators, principled, open-minded, caring, risk-takers, balanced, reflective students who care about humanity, develop an international mindset, and protect the world by creating a peaceful and better planet (IB, 2019).

Learners are to select one field among the six academic disciplines. Moreover, everyone needs to accomplish the three nucleus compounds that are situated at the heart of the programme: Theory of Knowledge (TOK), creativity, action, service (CAS), and the Extended Essay (EE). Among these core components of the IBDP, TOK specifically focuses on knowledge; it pushes students to question their knowledge and the way they know (TOK Guide, 2020). Consequently, learners can better develop in thinking critically to gain awareness for humanity and themselves in TOK course.

Considering the aims of the IBDP, a lot of research indicates that the DP meets what it intends to teach CT according to various studies. For instance, Double et al. (2023) compared the IB and non-IB students in their final years of study in high school in many countries. They ascertained that the pedagogical approaches employed by the IB programme, specifically teaching CT skills to students on a specific field and overall course, could be very influential in developing learners' CT

skills. Another study compared the IBDP's Language A1 course and the Turkish Literature and Language and Expression course of Turkish National Education. Aktas and Güven (2015) discovered that the Language A1 course of the IBDP made greater contributions to students' CT skills than the Turkish Literature and Language and Expression course of the Turkish Ministry of Education, according to the interviews they conducted with students.

In conclusion, as the research indicated above, the IBDP meets its requirements, particularly developing CT of students, besides the IB's objectives and aims. Above all, the core component of the IBDP, which is Theory of Knowledge (TOK) course, peculiarly focuses on CT. Although CT is a desired and vital skill in all IB programmes, how CT takes place in TOK course is truly worth exploring.

What Is Theory of Knowledge Course?

The origin of Theory of Knowledge is based on epistemology, which is the investigation of the origin of knowledge and justification. Therefore, it requires examining resources, requirements of knowledge and justification (Crumley II, 2009).

For this reason, epistemology involves critical thinking as it encourages people to ask similar questions in TOK course, such as "What counts as good evidence for a claim?" or "What constraints should there be on the pursuit of knowledge?" (TOK Guide, 2020). Answering those kinds of questions requires considering the relationship between knowledge, belief, reason, evidence, and reliability. Therefore, it includes the aspects of CT by encouraging people to see a subject from different perspectives, such as evaluating and analysing. Therefore, like epistemology, TOK lesson aims to encourage students to be open-minded,

questioning, and enthusiastic lifelong learners by examining their knowledge on their own.

In TOK lessons, students can specifically investigate the knowledge and the procedure of knowing (TOK Guide, 2020). It is one of the core components of the IBDP, which every candidate has to successfully complete. Teachers have to commit at least 100 class hours (TOK Guide, 2020). Students inquire about their own knowledge by comparing and making connections between the areas of knowledge. Also, it helps learners be more enlightened about their own beliefs, and perspectives as well as those of other people (TOK Guide, 2020). The overall aim of the lesson is to consider the sources, areas, and limitations of knowledge besides the process of knowing. In this way, the primary aim of TOK lesson is to help students to reflect rather than teaching them a new subject matter so that they can gain a perspective (TOK Guide, 2020).

The assessment consists of two tasks in TOK. The first assessment is the TOK exhibition, where students demonstrate how TOK displays the world we live in. The TOK exhibition is internally evaluated in which teachers give grades, while the IB is the external moderator at the end of the course. Another assessment is the TOK essay, which is evaluated externally by the examiners of the IB. Students must complete a 1,600-word paper which includes one out of six specified headings pointed out by the IB for every testing session (TOK Guide, 2020).

The TOK lesson can be arranged in various ways, which gives the teacher flexibility to proceed with the lesson. Teachers can prepare any content compatible with the student's interests and needs throughout the course. Accordingly, teachers can create lessons to practice versatility, invention, and novelty (TOK Guide, 2020).

Considering the aims and objectives of TOK, despite the rarity of the research, many studies are revealing that TOK lesson enhances students' CT, which is one of the main aims of the lesson. Cole et al. (2015) have discovered that TOK lesson helps students increase their level of CT compared to non-IBDP students. The DP and non-DP first-year university students were involved in the study, and the researchers found that the IBDP students' level of CT was higher than that of non-DP students. There is another research that investigated CT in TOK course. Wright and Lee (2014) also found that TOK course enhanced the cognitive skills of students, such as CT and self-reflection. Also, TOK helped students gain 21st century skills, as one of the participants of the study expressed (Wright & Lee, 2014).

Overall, TOK course is aligned with CT skills, which is a lifelong skill students can use and be successful by using CT skills in many areas of life. Therefore, gaining CT skills is beneficial for students during and after their academic lives, and the role of TOK course in enhancing CT is incontrovertible. It is also important to note that teaching CT is also related to teachers' ability to teach it; in other words, teachers' self-efficacy (SE) is another vital factor in teaching CT. For this purpose, knowing how teachers implement CT into their lessons in TOK or in different contexts is important, as teachers' SE can influence many factors in education, but this study mainly focuses on how TOK teachers' SE is related to their teaching CT.

Teachers' Self-Efficacy and Teaching Critical Thinking

Teachers' self-efficacy holds great importance in education. Briefly, SE is a belief in someone's capabilities to have the desired result in a student's interest and learning, even for those who are not motivated and difficult to deal with (Armor et al., 1976; Bandura, 1977). As the definition indicates, SE might be quite influential

in teaching and learning because when teachers believe in their capacity to teach effectively, they can be more likely to see the desired outcomes from students. Taking into account the impact of SE, teaching CT gains more importance when it comes to teachers' SE because high and low levels of SE can be directly related to teachers' teaching CT.

There is an abundance of research on teachers' SE in teaching CT; alas, there is no direct research investigating teachers' SE in teaching CT in TOK courses. For instance, Bergeron and Rogers (2019) explored the perspectives of the TOK teachers in IB World Schools, and they found that teachers' interest was the most effective factor in being successful in teaching TOK course. Therefore, we might relate teachers' interest in teaching TOK in a better way to their SE because they would be more enthusiastic to teach TOK and CT. Dilekli and Tezci (2016) also investigated teaching thinking skills and teachers' SE. They discovered that teachers' SE levels had a huge impact on teaching thinking skills, namely CT skills, besides the teachers' style of teaching CT (Dilekli & Tezci, 2016). Another study by Dilekli and Tezci (2018) showed that when teachers had low SE, they were less likely to teach CT effectively because they could choose incorrect and unsuitable teaching techniques in a learning environment. Moreover, they could be unmotivated to take risks or to try different techniques while teaching.

In light of the studies mentioned, SE is a distinguished skill for teachers as it creates a vast impact on students and teachers as well. Therefore, having a higher SE level suggests teaching CT better than teachers who have lower SE levels, which is essential to know because it may determine the quality of teaching and education.

Problem

A goal of the IBDP is to raise students who are inquirers, open-minded, curious to learn, and positive contributors to the world's peace and tranquillity (TOK Guide, 2022). Theory of Knowledge, which is one of the three main components of IBDP, essentially aims to provide and develop students' CT skills, such as justification and explanation. Although TOK course does not have a specific curriculum, there are certain themes that teachers should follow. As long as teachers follow these themes, they can produce the course contents according to their students' learning needs. This flexibility regarding teachers' development and implementation of course content supports teachers' autonomy and creativity. However, teachers may not always integrate appropriate teaching and learning strategies to develop and improve students' CT skills into their planning of the courses.

Another downside of this flexibility may be that it relies on teachers who have the capacity and wherewithal to recognize where, when, and how CT can be supported during their lessons. In other words, SE may play a powerful role in determining if TOK teachers successfully support students' CT. Therefore, it is important to identify factors that may influence TOK teachers' SE in integrating CT skills in TOK lessons. If these factors are identified, it may help to guide the professional development of TOK teachers.

Although there have been studies that investigated how the IBDP and TOK support the development of CT such as Cole et al. (2015), Bergeron and Rogers (2019), Condoleon (2019) and Wright and Lee (2020), there is limited research on the SE of TOK teachers and helping students gain CT skills.

Purpose

This study used a mixed method to investigate how TOK teachers report they encourage students to think critically during their Theory of Knowledge lessons. During the investigation, teachers from several countries, including Türkiye, shared the approaches and practices they use to develop students' CT skills. To further explore their practices, teachers were asked about their perceived SE regarding implementing CT in TOK lessons. The investigation involved collecting quantitative data via a questionnaire and then conducting the follow-up interviews to gather qualitative data. Descriptive statistics were used to summarize the questionnaire responses, and the researcher applied correlational analysis to learn if there was a relation between TOK teachers' SE level and a number of independent variables. A key outcome of the study was to learn the extent TOK teachers consider CT integral to their courses.

Research Questions

1. How do the TOK teachers define critical thinking?
2. How do Theory of Knowledge teachers integrate critical thinking skills into the Theory of Knowledge course?
 - a. How do TOK teachers report that they support the development of students' critical thinking?
 - i. Which teaching strategies do the TOK teachers use to support students' CT skills?
 - ii. What resources and support materials do the TOK teachers use to support students' CT skills?
3. What are the self-efficacy levels of TOK teachers regarding developing students' critical thinking in their TOK courses?

- a. To what extent are the perceived self-efficacy levels of TOK teachers related to each of the following variables:
 - i. Years of experience teaching TOK
 - ii. Years of experience teaching in general
 - iii. Undergraduate Major
 - iv. Years of education
 - v. Professional development opportunities for developing critical thinking
 - vi. Their self-perception about how IB professional development prepared them to develop students' critical thinking skills
 - vii. Their participation in any training focusing on CT skills
4. To what extent do TOK teachers agree CT is integral to the goal of TOK course?
 - a. Is there a relationship between teachers' agreement that CT is integral to the TOK goal and their perceived self-efficacy?

Significance

This study aims to investigate how teachers implement CT skills in TOK course, which does not have a set curriculum, and with which approaches and practices help them become more inquiring and researching individuals. Moreover, it is important to compare the SE of TOK teachers according to some variables to understand how self-efficacy is effective in integrating CT skills into TOK lessons according to the results obtained.

In this study, besides shedding light on the SE of the TOK teachers in integrating their CT skills into the lesson, it is important to research in terms of

analysing the variables affecting their SE, which are years of experience teaching TOK, years of experience teaching in general, major, years of education, professional development opportunities for developing CT skills, the participants' self-perception about how IB professional development prepared them to develop students' CT skills and their participation in any training focusing on CT skills. Therefore, this study is significant because it investigates the teachers' role and its impacts through the lesson, aiming to explore the teachers, educators, and researchers in the TOK lesson. Also, this study will help gain insights into the TOK teachers' perceived SE, stakeholders, and administrators in the world, which is the primary aim of TOK course.

Definitions of Key Terms

Self-efficacy (SE): Self-efficacy is people's perceived beliefs about their capacities to arrange and perform the steps that demand obtaining specified kinds of performances (Bandura, 1986).

The Theory of Knowledge (TOK): TOK helps students express the nature, scope, and limitations of knowledge and the procedure of knowing. The TOK focuses on not obtaining new knowledge but stimulating students to reveal and put into perspective their existing knowledge (TOK Guide, 2022).

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

Introduction

This review of the related literature consists of three sections. The first section presents how CT has a role in the IBDP through various research regarding the impacts of CT and its implementation. In the second section, the literature review reflects how TOK lessons have an impact on the CT skills of students besides the other variables such as teachers, school policy and culture. Although the research on TOK and CT is very limited, the research provides us with some perspectives and insights concerning the effects of TOK in the development of CT skills. Lastly, the final section portrays the importance of the SE of teachers and teacher candidates in teaching CT in their lessons in varying curricula and grade levels.

Evidence that The IBDP Promotes Critical Thinking

The IBDP values CT; therefore, it aims to raise inquiring, caring, and problem-solving students who can create and prolong a peaceful world (TOK Guide, 2020). One of the best ways to achieve these aims is to teach critical thinking. For this reason, integrating CT into lessons is one of the main reasons why the IBDP is appealing to many educational institutions. Several studies are presented here to demonstrate how CT exists in the IBDP curriculum and how the core components of the DP also foster CT skills through CAS (creativity action service), EE (extended essay) and TOK.

Many researchers investigated how the IBDP is effective in students' CT skills and how they use critical thinking skills in real life. To illustrate, many young people search for various information on the Internet, and they need to differentiate the correct information from the incorrect information. For this reason, they need some important skills, such as CT and digital literacy, to understand and obtain necessary information. Correspondingly, Horn and Veermans (2019) wanted to know how the IBDP can be distinctive in CT skills among IBDP and non-DP students in their research by applying a test. They examined the general role of the IBDP in helping to develop students' CT skills. They explored the efficacy and transfer of CT skills of pre-IB and second-year IB students at a school in Finland. They used an instrument that Stanford University developed to measure digital literacy. They administered the instrument to pre-IB and second-year IB students to learn the role of CT in their digital literacy. The results demonstrate that the CT level of the IBDP students is higher than the pre-IB cohort. Moreover, the study indicates that IBDP explicitly promotes CT skills by separating and embedding CT into the subject of a course. Considering that Finland is famous for its high-quality education, the impact of the IB programme is noteworthy in terms of CT skills.

Similar to the previous study, Hilal (2016) explored how the IBDP provides CT skills to students by comparing the Lebanese and the DP curricula, as the DP features CT skills through its curriculum. Thus, making a comparison between the two different curricula is definitely significant to see whether the DP is successful at CT. In her study, Hilal researched how CT is facilitated in the IBDP and the Lebanese Baccalaureate Programme (LBP). Her study featured Critical Thinking Friendly Teaching Methods (CTFTMs), which are questioning, wait time, model CT, relating concepts to students' daily lives, group work, and writing a research paper.

She collected data through semi-structured interviews, questionnaires, and class observations; her statistical analysis found that the methods that teachers use to assess students' CT in the IBDP significantly increase the programme's effectiveness in teaching CT. She, therefore, recommended that the LBP needs to include more opportunities for evaluating CT. She points out that the IBDP contains the elements and components of CT frequently and explicitly. Hilal notes that one reason why she may have found that the IBDP promotes CT more is because it includes a TOK course which the LBP does not.

The influence of the DP on students is noteworthy in terms of understanding its impact and how its philosophy really works for learners. Therefore, contrasting learners in different countries can be useful to see the DP's influence, especially in terms of the development of CT of students. In addition to the previous cross-cultural studies, Hopfenbeck et al. (2020) researched the influence of the IBDP on CT skills of learners in Australia, Britain, and Norway. They particularly investigated how the involvement of students in the DP developed their higher level of CT skills, which were evaluated by an accepted CT measurement tool named the Cornell Critical Thinking Test (CTTT). CTTT is a 52-item choice test which measures CT. It includes the components of CT such as "induction, deduction, evaluation, observation, credibility (the statements made by others), assumption, identification, and meaning" (Ennis et al., 2005, p.2). The test is separated into sub-sections with moderate to high reliability which lasts nearly 50 minutes to complete. First, the researchers analysed the IB documents and materials to learn how the IB combined CT within and across the DP subjects and its components. Afterwards, they compared the DP and non-DP students' CT levels who were from Australia, Norway, and England with the Cornell Critical Thinking Test through quantitative data

analysis. Lastly, they interviewed the DP students ($n = 18$) and teachers ($n = 9$) from various schools who participated in the second phase of the study regarding their experiences in teaching and learning CT in the DP. The investigation of the IB documents showed that CT is a significant skill that the IBDP promotes in all learners. The results of the CTTT demonstrated that the DP students' levels of CT were significantly higher than the non-DP students ($p < .001$) with a moderate effect size ($d = 0.48$). The researchers also compared the CT scores of grade 12 DP students and non-DP students. The results showed that grade 12 DP students' CT level was higher than grade 11 students which indicated that the advantage in developing CT of the DP students over non-DP students was more noticeable ($F(1,360) = 7.11, p = .008$). Moreover, CT is a skill that the IB offers explicitly in general and subject-specific levels. For instance, the TOK course develops students' CT since students learn to evaluate a subject from multiple perspectives. The teachers' expression also agreed that the DP enhanced students' CT levels as they learned to see different perspectives and evaluate, which made the DP learners more advantageous than non-DP students. Moreover, the extended essay helps students develop research and inquiry skills. The overall results demonstrated that the IBDP contributed CT of students which put the DP students in an advantageous position.

As previously noted, CT skills gain much importance in line with contemporary modern education. Consequently, various Eastern schools target to teach significant 21st century skills, such as cognitive and non-cognitive skills, as globalisation requires competence among pupils. Wright and Lee (2014) researched the role of elite IBDP schools in China and whether the IBDP promoted 21st century skills, namely, cognitive, and non-cognitive skills. They undertook a multi-site case study of five leading schools in China. The overall results showed that the IBDP

philosophy, specifically its pedagogy, curriculum structure and assessments, align with 21st century skills. The IBDP fostered cognitive and non-cognitive skills, particularly through the *Core Requirements*: CAS (creativity, action, service), Extended Essay (EE) and TOK. CAS encouraged students to gain leadership, communication, and intercultural understanding, while EE helped students obtain cognitive skills like creativity. Also, TOK specifically promoted the CT skills of students. Considering the cognitive and non-cognitive skills, the IBDP provided students with the opportunity to acquire CT skills besides leadership, communication and understanding of other cultures through CAS and EE.

In addition to the skills that the IBDP students acquired and used during their secondary education, Wright and Lee (2020) conducted another study, which concentrated on the understanding of the DP graduates' cognitive and non-cognitive skills and how these skills help them enroll in universities in Hong Kong by using a mixed-method approach. The survey's results displayed that the DP graduates had higher self-reported rates than the non-DP students in CT and other components such as creativity and leadership (.242, $p = .007$). Then, the participants gave insights into how the DP provided them with skills and intricacies in preparation for studying at university in the higher education context. The participants' ideas revealed that the DP has a different educational philosophy from conventional education, particularly in establishing vital skills such as CT, communication, and creativity. To this end, the results featured that the advantages of completing the IBDP are not only limited to secondary education.

Most of the studies mentioned above present the positive impact of the DP, especially on students. Yet, the DP's challenges might occur during the implementation, and those challenges could help administrators, teachers, and

shareholders with regard to offering a better learning environment for the development of students' CT skills. For this reason, knowing the challenges in the DP is vital for educators and schools to improve and understand how the DP helps students develop. Moriguchi (2018) investigated the challenges and merits of implementing the IBDP in Japan. He conducted a semi-structured interview methodology to understand how a national Japanese school implemented the IBDP based on the DP's educational theory because Japan, as a non-Western country, had its own educational philosophy, which included some differences from the IBDP, such as club activities and homeroom education system. According to the findings, the IBDP teachers had a role as facilitators, and they encouraged students to draw out the opinions of students, which was different to the Japanese educational system. Moreover, the Japanese students took a critical thinking test, and their CT skills were much different than six months ago, which indicated that the IBDP develops students' CT skills.

Different from most of the studies previously reviewed, Dickson et al. (2018) examined the IBDP's impact on teaching and learning by doing a thematic review of the literature. Although the success of the IBDP can be evaluated via students' achievement and various specific tests, how teachers improve themselves by attending professional development opportunities is also worth considering for both the success of programme implementation and the IBDP teachers in the world. Consequently, Dickson et al. centred not only on the students but also on the teachers by embracing the teaching and learning part of their study. The overall impact on the learning process of the IBDP investigated was positive despite some challenges. Most importantly, creativity, inquiry skills and critical thinking were highly attributed to the IBDP. Students were involved in active learning and inquiring rather

than memorising the facts, which encouraged them to investigate, think critically without prejudice and use their knowledge to be able to see community problems. Furthermore, the IBDP also encouraged teachers to help students develop their CT skills and learn inquiring through workshops or professional training. For this reason, participating in the IBDP training also could impact teachers' way of engaging in teaching the IBDP lessons. As teachers agreed, giving students a chance to think and inquire to learn instead of transmitting the knowledge was essential for students to learn.

The most recent research regarding the relationship between the DP and CT study was done by Lee et al. (2022), who reviewed the research literature written so far. According to the studies they explored, they found that the IBDP mostly enhanced students' CT skills, international mindedness, communication, collaboration, self-management skills, and creativity, according to many studies, including the current DP and DP graduates' statements. Additionally, current IBDP and graduate students' perceptions constantly displayed that their self-perception of creativity and CT skills was constantly higher than non-DP graduates and students.

All of the studies above demonstrated how the IBDP provides significant skills to students for the contemporary world and how students can acquire those cognitive and non-cognitive skills, principally CT skills. However, the learner profile is also effective in gaining CT and other necessary skills. Rizvi et al. (2014) examined the learner profile (LP) of IBDP using comparative and cross-cultural contexts. They aimed to discover how India, Hong Kong, and Australia adapted, interpreted, and implemented LP attributes in the DP, as they are different ethnic conventions. They employed two surveys to obtain the data. The first survey tested students' awareness and understanding of the LP qualities to contrast these over

locations. The second survey determined teachers' perceptions and ideas regarding the LP and its implementation at individual schools. The results demonstrated that being an inquirer, knowledgeable, thinker, being open-minded are among the attributes of the learner profile in the IBDP. Consequently, those features of the LP suggest that the IBDP fulfilled what the programme actually required, which were knowledgeable, inquirer, principled, thinker, open-minded, balanced, caring and reflective citizens.

In summary, the IBDP supports students in developing their CT skills, and DP learners benefit from these skills in their real lives and tertiary education. The literature review also suggests that studying the IBDP offers a lot of advantages for learners, such as attending CAS activities and learning to write EE, which helps them use and improve their CT skills in their real and academic lives.

How Does Theory of Knowledge Course Affect Critical Thinking Skills?

This section mainly highlights to what extent critical thinking has a role in TOK course. Although there is very limited research that focuses explicitly on TOK and critical thinking, the studies mentioned below reveal that TOK improves students' CT skills and encourages them to evaluate multiple perspectives.

Cole et al. (2015) found that TOK course enhanced students' CT skills. They collected the data through four qualitative case studies and open-ended items from survey instruments within the Australian context. They collected the data from current DP students and DP graduates in Australia besides TOK teachers and school leaders at IB World Schools. The CT skills of the DP and non-DP students were measured via two measures of CT skills. The DP students' CT levels ($M = 3.30$, $SD = 0.38$) were higher than non-DP peers ($M = 3.08$, $SD = 0.44$). Also, the researchers compared grade 11 and 12 DP students' CT levels and the results showed that grade

12 students' scores were higher than grade 11 students in CT skills. This result also demonstrated that students gained awareness in using their CT skills when they proceeded from the first to second year in the TOK course. Furthermore, the study demonstrated how other chosen non-DP schools taught CT skills and found that teaching CT skills is closely related to schools' culture, such as schools' nature, the variety of teachers, school policy and values, and the intellectual heritage that affects teaching CT.

Hughes (2014) also examined how TOK developed students' CT skills and identified ways in which the course can be improved. He investigated how TOK measures CT in terms of its aims, assessment objectives and assessment instruments. His study examined the alignment between the published research on CT and the TOK guide. He used qualitative research methods to assess the validity of the TOK guide in terms of command terms and vocabulary between task plans. The researcher found that although TOK encouraged students to think critically, its emphasis was mainly on epistemology and had limited real-life applications. He pointed out that the aims and assessments of TOK did not encourage students to make predictions, inferences, or decisions besides solving problems. Overall, Hughes emphasised that TOK course promoted some elements of CT, not all of them, which compromised the ability of the course to support critical thinking completely.

Different from the other studies, Bergeron and Rogers (2019) investigated the teachers' perspectives regarding TOK course, such as its benefits, purpose, and elements of success that were based on the quality of TOK lessons. They utilised mixed methods to learn about TOK teachers' perspectives in IB schools around the world. They applied a survey to 1,534 TOK teachers and investigated 33 teachers in focus groups in Australia, The Netherlands, and the USA. Firstly, they wanted to

learn about teachers' perceptions of TOK course, then TOK course's impact on teachers, and lastly, implementation questions to find out the teachers' views on TOK lessons. The teachers' perceptions demonstrated that TOK's principal aim was to gain awareness for students regarding the construction of knowledge besides critical examination and restatement by people and society. Secondly, the teachers ranked that TOK course provided students with the ability to make connections between academic disciplines together with thoughts, feelings, and actions. Moreover, the findings showed that students become better at critically evaluating knowledge and identifying and reflecting on individual presumptions. Additionally, teachers also gained integral skills like their students, such as seeing different perspectives, having an open mind, and being disinclined to judge others due to teaching TOK courses. According to the TOK teachers' statements, teaching TOK course also reinforced their teaching style in other lessons. Also, TOK was student-centred, contemplative, interdisciplinary and included real-world issues, which were principal parts of teachers' teaching TOK. Accordingly, teachers believed TOK lessons enhanced students' and their CT skills.

Chatelier (n.d.) conducted a study funded by the Jeff Thompson Award, a grant program through the IB, and he reported that TOK helped students develop CT. He aimed to investigate the experience of teachers trying to integrate TOK into everyday teaching and what this meant for them. He mainly wanted to discover TOK teachers' perceptions of TOK course's purpose and their thoughts on integrating TOK into their lessons. He used semi-structured interviews and gathered data from 24 TOK teachers by analysing themes and implications. The results demonstrated that TOK was a significant element of the IBDP as it offered students many benefits, such as understanding and seeing multiple views regarding knowledge and truth. The

overall study revealed that TOK course supported students in gaining CT skills, multiple perspectives, and awareness of epistemology to students.

Similar to the previous study, Condoleon (2019) also explored how the IBDP teachers adapted, interpreted and integrated TOK into their lessons in non-Western conditions. He employed a qualitative case study by focusing on three international schools in India, Thailand and China. The study found that the subject teachers revealed an intellectual understanding and formation of TOK lesson, which provided teachers and students with work collaboratively, mostly via dialogue, so that students could develop CT skills and become more epistemically aware. The literature named this occasion as “transaction orientation” in TOK lessons, which is considered the essential role of TOK course with the help of the discussions of knowledge questions. Furthermore, the findings demonstrated that TOK course augments the CT skills of students, especially by contrasting and assessing dissimilar angles. That result did not mean the epistemological aspect of TOK lacks, but students’ epistemological awareness becomes stronger, specifically understanding the construction of knowledge through different ways of knowing and different areas of knowledge. Consequently, teachers believed that TOK improved the CT skills of students, so they implicitly implemented it into their lessons.

In conclusion, the literature review highlights that TOK lesson has a positive impact on students with regard to developing CT skills. Through TOK, students can analyse and examine how they constructed the knowledge and learned the ways and areas of knowledge which encouraged them to evaluate multiple perspectives. This process can help students recognize and address any biases they may possess. Furthermore, TOK teachers are also able to develop their CT skills while teaching TOK.

Self- Efficacy and Critical Thinking

In the 21st century, CT is a must skill that students need to acquire and master; thus, teachers have a huge role in teaching CT skills to students. Knowing that there can be many components that affect teaching CT skills, teachers' ability to teach CT skills is also related to their SE. Therefore, many researchers aimed to find how SE is significant in teaching CT skills. Unfortunately, research about the impact of teachers' SE level and their teaching TOK course in terms of implementing CT skills is lacking. For this purpose, in this part of the literature review, how SE has a role in teaching CT skills in different educational systems is presented.

Yeşilpınar and Doğanay (2014) explored the SE perceptions of primary school teachers and primary school teacher candidates towards teaching CT. In line with this main purpose, the participants' views and conceptualisations on CT and their perceptions of SE were conferred. They used a qualitative approach and interviewed the teachers and teacher candidates. Their investigation indicated that more than half of the classroom teachers perceived themselves as moderately sufficient in teaching thinking skills, while the primary school teacher candidates perceived themselves as moderately sufficient and sufficient in teaching thinking skills. Moreover, in terms of using methods, techniques and strategies suitable for the teaching of CT skills, the findings revealed that most of the candidate classroom teachers identified themselves as sufficient in teaching thinking skills. Additionally, nearly half of the classroom teachers and the majority of the pre-service teachers perceived themselves as sufficient in organising the classroom environment through the development of CT skills. More than half of all participants perceived themselves as competent in transferring CT skills to real life. Also, more than half of the participants- primary school teachers and teacher candidates perceived themselves as

sufficient in evaluating CT skills. Overall, the class teachers' perception of SE regarding the assessment of CT skills was higher compared to the teacher candidates. On the other hand, the teacher candidates' perceptions of SE in CT skills were higher than the classroom teachers.

Dilekli and Tezci (2016) also analysed the relationship between teachers' practices in teaching thinking skills, individual variations, SE, and how they teach. They collected the data from 1003 class teachers by employing three dissimilar scales. Firstly, they gathered data for teachers' classroom practices for teaching thinking skills; secondly, they measured teachers' thinking skills; and lastly, they used Grasha's Teaching Scale to define teachers' teaching styles. The correlation results displayed that there was a low-level relationship between teaching thinking skills overall mean and teachers' general style of teaching means. The data analysis also revealed there was a positive link between facilitator teaching and the practice of teaching thinking skills of teachers. Additionally, the study showed that there existed a positive correlation between facilitator teaching style and SE, which indicated that facilitator teachers had higher SE for teaching thinking skills.

More recently, Dilekli and Tezci (2020) investigated how teachers' SE perceptions of teaching thinking skills vary according to their countries, gender, teaching fields, and professional seniority. They collected data from 653 teachers working in 6 different countries by using the scale *Teachers' Self-Efficacy Towards Teaching Thinking Skills*. Furthermore, the researchers analysed the joint impact of self-efficacy perceptions of teachers on gender and teaching field, gender and professional seniority, country and teaching field, and country and gender. The findings revealed that Romanian and Spanish teachers' SE belief scores were the highest, while Bulgarian and Greek teachers had the lowest SE belief scores.

Furthermore, female teachers' perception of SE for teaching thinking was higher than that of male teachers. Soft science teachers had higher SE beliefs for teaching thinking compared to hard science teachers with regard to the teaching field. Also, teachers with 6-10 years of professional experience in teaching scored highest in the Design aspect, while teachers with 1-5 years of experience in teaching scored highest in practice and Competence design regarding professional seniority. In the general scores in SE perceptions for teaching thinking, the Design aspect had a higher mean than the Practice aspect, whilst the Competence aspect had the lowest score. The results showed that the teachers had high SE beliefs for teaching thinking in general.

In addition to these studies, Arce-Saavedra and Blumen (2022) investigated the relationship between inclination towards CT, creativity and innovation in performance, SE and teaching practice by collecting data from Peruvian teacher trainers. Firstly, 112 teacher trainers living in Peru took the *University of Florida-Engagement-Cognitive Maturity-Innovativeness* scale which allowed the authors to critically assess the participants' thinking skills. The researchers employed *Teachers' Self-efficacy towards Teaching Thinking Skills* generated by Dilekli and Tezci in 2018. They measured the SE level of teacher trainers besides their pedagogical practice. In addition, Arce-Saavedra and Blumen used the *Teachers' Teaching Thinking Skills* scale that Dilekli and Tezci created in 2019. The whole findings indicated a positive and significant relationship between inclination to CT and pedagogical practice. The results also revealed that teachers must be critical thinkers to develop their CT and blend it into their courses.

As with other studies, Ektem (2016) focused on investigating prospective teachers' awareness and ideas regarding executing the constructive approach. She applied the *Self-Efficacy Scale for the Implementation of Constructivist Approach*

survey to the 528 senior year students at Necmettin Erbakan and Selçuk University. She had semi-structured interviews with seven prospective teachers. According to the results, the teacher candidates' SE beliefs score was high in terms of planning lessons with regard to the constructivist approach, learning-teaching and process of testing and evaluation and providing learning conditions. Additionally, the teacher candidates stated that when they took training on constructive approach, their SE beliefs concerning the implementation of the constructive approach to their lessons were higher. That result also displayed that the teacher candidates could be more successful in implementing a constructivist approach into their lessons when they received training about it.

Teachers also need to consider meeting the curriculum standards and how they can create an impact on their students in teaching CT skills, which is affected by their SE. Baysal et al. (2010) explored how preservice teachers' SE level is significant to meet the curriculum's objectives in terms of teaching thinking skills. Specifically, they focused on how preservice teachers' SE levels differ according to their year of study, their SE levels in providing classroom conditions to promote thinking (factor 1), training them to have higher-order thinking skills (factor 2), transferring teaching (factor 3) and acknowledging the way students reflect (factor 4). The researchers applied the Turkish version of the *Assessing Teachers' Self-Efficacy Towards Teaching Thinking Skills* scale (Tebbs 2000) to 263 third and fourth-year Elementary Teacher Education students of Marmara University. The findings concluded that the perceived SE levels of teacher candidates were quite sufficient, and their perceived SE levels did not vary in accordance with the year of study. Moreover, the attendees perceived themselves as having quite sufficient SE levels in factors 1 and 3, while they expressed their perceived SE levels somewhat

sufficient in factors 2 and 4. Overall, the results displayed that the increase in participants' perceived SE levels in their teaching thinking skills also led to the increase in their analytical, practical, creative and critical thinking levels. Therefore, there was a strong relationship between the scale's factors and thinking levels.

To conclude, teaching CT skills is crucial in contemporary education as students need to learn and internalise CT to develop themselves, use their logic effectively and compete with others in the 21st century. For this purpose, teachers' levels of SE and integrating CT are becoming more important. As the studies featured in this section of the literature review, the implementation of CT skills is also associated with SE. When teachers have a high level of SE, students' capacity to acquire CT skills increases.

Conclusion

CT is a vital ability that many curricula and schools aspire to include and integrate into the lessons. The previous studies helped confirm that the IBDP, in general, and the TOK, in particular, help develop students' CT skills. However, the researchers provided limited information about what actually goes on in the classroom to develop the CT skills of students. In other words, it is still unknown which teaching methods are used and which resources are incorporated into TOK lessons to teach CT skills. On the other hand, the effect of self-efficacy is undeniable in teaching CT. The studies mentioned above indicated that when teachers had a high self-efficacy level, they were more successful at teaching thinking skills, which emphasised the importance of SE in teaching CT. Although there is some research focusing on teaching CT skills and the level of SE of teachers, there is still the need to explore teachers' practice of CT and TOK to gain more knowledge and insights.

CHAPTER 3: METHOD

Introduction

This study examines how TOK teachers integrate CT into their lessons. Moreover, it investigates TOK teachers' level of SE regarding implementing CT into their lessons. This chapter describes how this study was conducted by using a mixed-method approach to collect and analyse data regarding TOK teachers' CT practices and perceived SE. Quantitative data was collected through a questionnaire and analysed descriptively and inferentially. Qualitative data was gathered through interviews and inductively and deductively analysed. The chapter includes information about the study population, instrumentation, and data analysis.

Research Design

This study incorporated mixed explanatory research methods. First, the participants completed the quantitative part which was in the questionnaire, and then they completed the qualitative part through the interviews. Explanatory approach is used in this study which aims to anticipate future occasions and provide an explanation for phenomena occurrences (Sue & Ritter, 2012). Using a mixed explanatory approach allowed the researcher to gain comprehensive insights into how TOK teachers taught CT skills in their lessons since the qualitative and quantitative data provided more information about the materials, approaches and resources the teachers used besides how their SE was important in teaching CT. In the mixed method approach, the researcher uses the quantitative and qualitative data and interprets it with the help of the strengths of both data results to be aware of the research problems (Creswell, 2014).

The quantitative data was collected via the questionnaire to comprehensively explore how TOK teachers implement CT into their lessons. The questionnaire was designed to measure participants' SE levels as well as the materials, resources and approaches they use in TOK lessons. Quantitative studies collect numerical data that allows for precise and trustworthy calculations and analysis of data through statistics (Goertzen, 2017). In this study, the data was analysed descriptively as well as inferentially. The inferential statistics involved correlational research design. In correlational research, the relationship between two or more variables is investigated, but the researcher does not intervene in the variables to influence the study (Fraenkel, 2018). Thanks to correlational research, we can understand the relationship between variables, which helps us express the behaviour of people and foresee prospective consequences (Fraenkel, 2018).

Qualitative data was obtained through follow-up interviews. Qualitative data provided deeper insights into TOK teachers' abilities, ideas and approaches to implementing CT. Interviews allow participants, interviewers or interviewees the opportunity to express their ideas and perceptions about the world and how they interpret and perceive, besides how they analyse the occasions from their own point of view. Therefore, interviews are not only about data collecting, but it is a part of life which makes human incorporation inevitable (Cohen et al., 2007). Through interviews, TOK teachers could express and exemplify the points that they stated in the questionnaire more explicitly via interviews.

Context

The IBDP is an international program which is for 16-19-year-old students. It seeks to develop inquiring, knowledgeable, self-assured, and caring young learners. The IBDP cares about the ownership of the knowledge of learners who can develop

the necessary skills for the future, create a difference to prosper in a fast-changing world and be ready to take action (TOK Guide, 2020).

The IBDP education is challenging but also balanced, as it helps mobility around the world by enabling a worldwide accepted university entry credential. Therefore, the IBDP aims to develop students who can accommodate themselves to 21st century skills such as being inquirers, thinkers, open-minded, reflective and knowledgeable (TOK Guide, 2020). The IBDP has three core components: TOK, CAS and the EE.

As a core component of the IBDP education, TOK course focuses on the exploration and reflection of the nature of the knowledge and the procedure of knowing. TOK course challenges students to question the knowledge they gained from their academic lives and outside of their classroom; therefore, TOK course is thought-provoking for students. In this way, TOK encourages students to come up with their own views and knowledge, discuss their views with others and understand what others think. Students can improve their own understanding of the world besides the world around them (TOK Guide, 2020). Considering the IBDP's education philosophy and TOK course aims, it was so important to see and understand exactly how TOK teachers implement CT into their lessons.

As of November 2023, there are more than 5,700 IB world schools worldwide in 160 countries (IB, 2023) Türkiye has 115 IB world schools, and the DP is offered by 73 schools, mostly located in İstanbul (IB, n.d.). The majority of these IB World schools are private high schools, while the IB World state schools are just a few. Therefore, the context of this research includes the TOK teachers in international settings as well as national ones. The TOK teachers are mostly English Language

teachers who studied English Language and Literature or English Language Teaching at university.

Participants

Participants of the study included 77 TOK teachers. Of the participants, 39 indicated they work outside of Türkiye, and the rest work within the country or chose not to write their country or location. Most of the respondents majored in English Language and Literature (29.9%) or English Language Teaching (19.5%). Ethical permission to work with these participants was secured through the university (Appendix A) and the Ministry of National Education (Appendix B).

Instrumentation

As this was a mixed methods investigation, two instruments were developed for the study. The first was a questionnaire used to collect quantitative data. The second was a set of interview questions aimed to collect qualitative data. Further information about both instruments is provided below. For both the instruments, participants indicated they understood the purpose of their study and consented to have their responses included.

The Questionnaire

The questionnaire used for this study consists of five parts and can be found in Appendix C. The questions were developed or identified to address the research questions of the study. The first part collected demographic information of TOK teachers. The second part was designed to learn how teachers define CT. Participants were given a list of established definitions of CT and asked the extent to which they agreed with each definition. They were also asked to write their own definition. In part three TOK teachers identified teaching strategies they use to support CT in their courses and in the fourth part they noted which resources they use respectively.

The fifth and final part of the questionnaire consisted of a series of Likert-scaled items where participants reported their ability to develop students' thinking skills. These items were used and adapted with permission from a questionnaire developed by Dilekli and Tezci (2018). In their study, the researchers discussed how they developed and validated their instrument. Their Cronbach Alpha coefficient value was .94, which indicates a high level of reliability. The validity was further confirmed through a Confirmatory Factor Analysis, which resulted in conducted factors: design, practice, and academic competence.

Prior to administering the questionnaire, three items were removed from the questionnaire because they were irrelevant to the practices of TOK teachers. Also, three TOK teachers were asked to complete and review the questionnaire. They made recommendations to adjust the wording and add items. After their review, the instrument was converted to an electronic platform using the Qualtrics software program.

Based on the pilot review, The Cronbach's Alpha value of the last part of the questionnaire was .944 which is very reliable. Cronbach's alpha demonstrates the reliability of overall α calculations which may represent a questionnaire or other items (Bonett & Wright, 2015). To further examine the validity of these items, a principal component analysis was conducted as a type of factor analysis. These statistical methods are used to simplify complex data (Jolliffe & Cadima, 2016; Kline, 1994). Unlike the original questionnaire, only one dimension or factor was found, which is competence. The scree plot was checked which demonstrated that there was only one dimension, so the questionnaire was unidimensional as the line was linear on the scree plot and the other dimensions' values were not close to 1. One reason for this difference may be because of the small number of participants.

Another may be because the audience, all being TOK teachers, are like-minded. Despite the difference in several factors, with the strong reliability coefficient, the analysis supported the use of the questionnaire for the current study.

Follow-Up Interview Questions

The researcher, in collaboration with an expert research team, created eight open-ended interview questions, including the sub-questions, which participants could take voluntarily after they completed the questionnaire (Appendix D). The questions followed the general pattern of the questionnaire and were designed to provide deeper insights into the quantitative data.

Two experienced TOK teachers agreed to participate in a pilot of the questions to support the validity and reliability of the questions. A pilot study is a small-sized experiment of the suggested process (Fraenkel et al., 2018). After the pilot study, the researcher adjusted the interview questions according to the two participants' feedback and did the revisions until the interview questions were clear and understandable to every teacher. Through participant responses to the interview questions, the researcher understood how TOK teachers implemented CT skills in their lessons through their verbal explanations in more detail.

Method of Data Collection

Ethics approval was received from Bilkent University (Appendix A) to administer the questionnaire to TOK teachers living abroad. To conduct the questionnaire for TOK teachers living in Türkiye, the researcher obtained permission from the Ministry of National Education of Turkey (Appendix B) (MoNE). After obtaining permission from Bilkent University and MoNE, the researcher sent the questionnaire to the participants with the consent form so that the participants could learn the purpose, content and the instrument administered for this study.

The questionnaire was administered electronically through email and social media (LinkedIn, TOK forums, WhatsApp groups). The message of the email invited TOK teachers from around the world to complete the questionnaire. Similar methods were used to administer the questionnaire within the country. Department heads and IBDP coordinators were also asked to help to encourage participation. Their responses were collected through the software program Qualtrics. In total, 103 TOK teachers responded to the questionnaire; however, only 77 answered all the questions and these were the participants that were included in the study. The reason for the exclusion was that the participants did not complete the last part which measured SE.

As noted above, the questionnaire included an item asking participants if they were willing to be interviewed and if so, to provide an email. After contacting these individuals, Zoom meetings were conducted in July and August 2023. The interviews were recorded and kept in a password-protected location on the researcher's computer.

Data Analysis

Descriptive statistical analysis was used for the first four parts of the instrument. Descriptive analysis is an approach that many researchers use to depict the type and scope of sensory features accurately. It provides statistically reliable, objective and analysable data by processing the sensory data successfully. Therefore, it is an essential method today (Kemp et al., 2018). Qualitative data analysis was used for open-ended items. The TOK teachers' open-ended answers regarding the definition of CT were analysed according to the keywords they used.

The study also examined how the mentioned independent variables could have an impact on TOK teachers' SE regarding CT implementation. To examine the relationship between the dependent variable (perceived self-efficacy) and the

independent variables, a multiple linear regression analysis was utilised. Multiple Linear Regression presumes a linear link between a dependent variable and a group of explanatory variables (Schmidheiny, 2013). The independent variables were years of experience in teaching TOK, years of experience teaching in general, major of study, highest degree earned, and professional development in IB and TOK. The TOK teachers were also asked if their professional development supported their teaching CT.

To examine if there was a relationship between participants' perception of the importance of CT to the TOK teachers and the teachers' SE, the study used Spearman's rho correlation analysis. Spearman's rho is regarded as the standard Pearson correlation coefficient regarding the percentage of variability explained (Hauke & Kossowski, 2011). The correlation analysis could basically be used as a demonstration of the construct validity.

Regarding the qualitative data, as noted, the interviews were recorded, and the researcher was able to rewatch the videos and observe verbal expressions and listen to the participants' ideas and perspectives. Voice-to-text software was used to transcribe the interviews, which were then compared to the recordings to ensure accuracy. Content analysis was used to examine the responses of the interviewees. Content analysis enables researchers to portray the phenomenon theoretically, objectively and systematically (Kyngäs et al., 2020). The purpose of qualitative content analysis is to convert a huge amount of text methodically into a very organised and brief summary of the most essential results (Erlingsson & Brysiewicz, 2017). The researcher deciphered the verbal statements of the participants and condensed participants' explanations to omit unnecessary or repeated words for the content analysis.

Most of the data was inductively analysed. The researcher coded the data of the TOK teachers' ideas concerning the main idea of the question asked them. The codes were grouped to create key themes, which were then defined by dividing them into titles. Findings were interpreted according to the themes and the research questions. A conceptual framework developed by Facione (1990) was used to deductively analyse teachers' definitions of critical thinking. In this case, the teachers' responses were compared to the dimensions of the framework to identify similarities and differences.



CHAPTER 4: RESULTS

Introduction

This study explored how TOK teachers report they develop students' CT in their TOK courses. In the study, the mixed method was used. Firstly, the information was gathered through a questionnaire, and then interviews were conducted with volunteer TOK teachers to provide further insights into the results. The participants of the study were Turkish and non-Turkish, which provided an international context. While 103 TOK teachers responded to the questionnaire, unfortunately, only 77 of them completed the instrument completely to be included in the analysis. The findings are presented according to the order of the research questions and related sub-questions. The frequencies and means of the responses can be found in Appendix E. In addition to the questionnaire responses, 6 teachers agreed to participate in a follow-up interview that provided qualitative data. These teachers are labelled Teacher A, B, C, D, E, and F.

How Do the TOK Teachers Define Critical Thinking?

The results of question 1 were obtained from the second part of the questionnaire which was augmented with the participants' personal explanations learned via open-ended parts in the questionnaire and open-ended follow-up interview questions. Each of the sub-questions' answers was also addressed using both quantitative and qualitative data.

TOK Teachers' Definition of Critical Thinking: Quantitative Results

For this part of the research question, participants were asked to choose one of four established definitions of CT and then asked to provide their own definitions.

The results of their responses can be found in Table 1 below. The results revealed that participants generally agreed with all the definitions of CT. Of the participants, 28 strongly agreed with Facione's definition which was the decision of the majority. Some participants also disagreed with this definition and others.



Table 1

The Definitions of Critical Thinking by Well-known Scholars and Their Means Including the Participants' Responses (N=77)

Critical Thinking Definitions	SD	D	N	A	SA
“reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p. 45). N=73	n=3; 4.1%	n=5; 6.8%	n=13; 17.8%	n=34; 46.6%	n=18; 24.7%
“skilful, responsible thinking that facilitates good judgment because it 1 relies upon criteria, 2 is self-correcting, and 3 is sensitive to context” (Lipman, 1988, p. 39). N=68	n=1; 1.4%	n=1; 1.4%	n=11; 16.1%	n=36; 52.9%	n=19; 27.9%
“purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based” (Facione, 1990, p. 3). N=66	n=1; 1.5%	n=0 0%	n=6; 9.0%	n=31; 46.9%	n=28; 42.4%
“thinking that is goal-directed and purposive, thinking aimed at forming a judgment,” where the thinking itself meets standards of adequacy and accuracy” (Bailin et al., 1999b, p. 287). N=65	n=0 0%	n=8; 12.3%	n=18; 27.6%	n=25; 38.4%	n=14; 21.5%

Note. SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

TOK Teachers' Definition of Critical Thinking: Qualitative Findings

In the questionnaire, the participants provided the following terms and phrases to define CT:

Questioning what we know and how we know, the value of knowing, evaluating, deciding what to believe and making a judgment, interrogating others' claims, considering multiple views, being open-minded and reflective, thinking logically free of bias, disseminating the information from pure supposition and discussing.

During interviews, the participants were asked to interpret and explain the questionnaire results of the provided CT definitions. They explained that Facione's definition might be the most popular choice because it was the most comprehensive and specific definition among all others. Some of the interviewees also liked Lipman's as it was very straightforward and briefly explained the definition of CT, besides mentioning sensitivity to context. However, the "self-correction" word used by Lipman confused the participants as they could not understand what Lipman meant by self-correction. As one of the participants said, *"I can correct it as needed, or it can be corrected by a person. I'm not sure what that means, self-corrected."*

Participants were asked to examine definitions of critical thinking further, especially as they relate to TOK. The data was first analysed deductively, using the framework of CT developed by Facione (1990), and then inductively to reveal other themes. Some themes overlapped with Facione's definition, such as inference, analysis, and evaluation. However, as Figure 1 displays, the participant responses included other themes that were different; this may be because their definitions seemed to align with higher-order thinking skills, such as those outlined in Bloom's taxonomy. Bloom's revised (Krathwohl, 2002) taxonomy consists of knowledge,

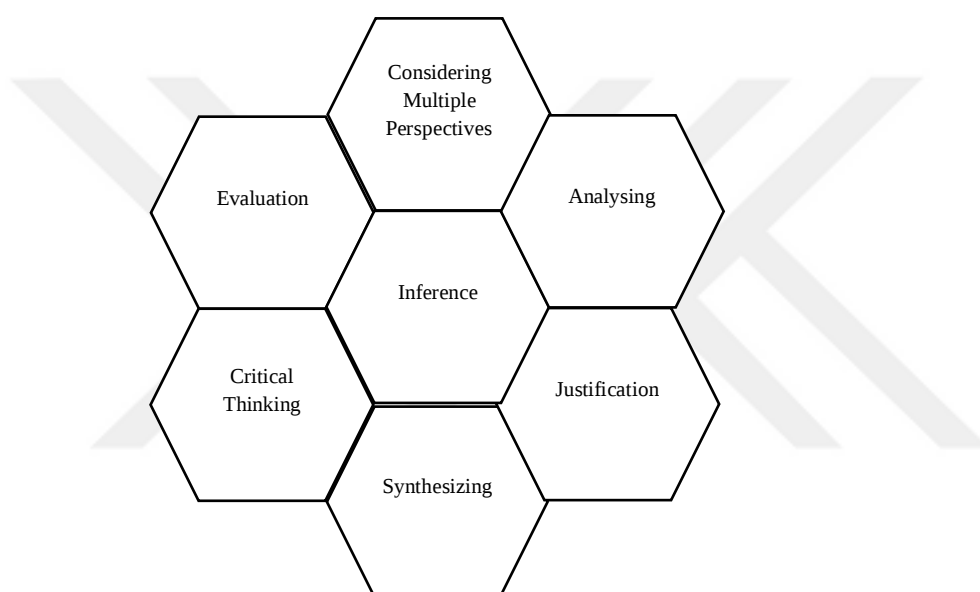
comprehension, application, analysis, synthesis and evaluation, so there are some common words, such as synthesising, analysis and evaluation, expressed by the teachers.

Figure 1 depicts a revised framework based on the questionnaire responses.

Figure 1

The Components of Critical Thinking Created according to the Participants'

Definitions through Deductive and Inductive Content Analysis



Following are some exemplary definitions of CT provided by the participants.

Participant E described CT as:

Being able to consider multiple perspectives on a concept, connect concepts with each other, synthesise and analyse concepts, and apply synthesis and analysis across different texts. It is also related to concluding. Under the umbrella of analysis and synthesis, critical thinking is definitely used to evaluate.

A definition provided by Participant C defines CT as follows:

Critical thinking is looking at an issue from multiple perspectives in depth, considering different viewpoints and ideas, and then using that information to come up with your own thoughts. Also, it means to see what type of evidence those different viewpoints present with their arguments.

This definition, provided by Participant F, illustrates how teachers align CT with Bloom's taxonomy:

Critical thinking is to think independently and to question what you know thoroughly about whatever besides trying to think with an open mind and considering different perspectives and being aware of multiple aspects. Questioning includes analysing, interpreting, and evaluating the question. The questioning and the analysing come first, then evaluating, then synthesising information. It can be a process and one might reach a tentative conclusion depending on the situation

How TOK teachers Support the Development of Students' Critical Thinking

Participants were asked a number of questions about which teaching methods they use to promote students' critical thinking. They also were asked to identify the resources they used. In the questionnaire, they read a list of options and indicated which one they used; open-ended questions were available to provide supplemental or alternative information. The follow-up interviews were used to provide more insights into their practices.

TOK Support Materials and Teaching Strategies: Quantitative Results

The results from the questionnaire showed that teachers commonly used reflective writing, cooperative work, and open-ended questions. Teachers did not

report inviting guest speakers to develop students' CT as a particular strategy. The responses are reported in Table 2 below.

Table 2

Teaching Approaches to Help Develop CT (Teachers Could Select More Than One Option) N=77

Critical Thinking Approaches	<i>n</i>	%
Cooperative work	72	94.7
Open-Ended Questions	72	94.7
Reflective writing activities	72	93.5
Debates	67	90.5
Inquiry Statements	68	89.5
Short Essays	67	87.0
Mock Exhibition	62	83.8
Oral presentations	67	81.6
Self – Evaluation/Reflective Essays	60	78.9
Case study	55	73.3
Socratic Dialogue	51	68.0
Problem based learning	45	62.5
Project-Based Learning	45	62.5
Role-play	40	55.6
Guest Speakers	31	42.5

Respondents provided case studies, discussing multiple viewpoints, visuals and videos, supplementary texts, scoring past papers, Socratic seminars, and keeping journals as other approaches they use in their classes. A few of them noted that when they assign homework, they ask students to conduct research, analyse and evaluate information.

The participants also reported that they used a variety of resources to support students' CT development as it can be seen in Table 3. The most commonly used resources were reported as real-life examples along with videos, news and journal articles. Respondents were asked to add additional resources they use. One respondent mentioned the KIALO debate tool, and another noted it was important for students to learn how to use the internet and social media critically. Other

suggestions are listed here, although they seem more like methods than resources: thought experiments, visible thinking routines, peer review, hot seating, mock court to defend a stance on a topic, and creative self-expression such as poetry or short filmmaking.

Table 3

Resources to Help Develop Critical Thinking (N=77)

Resources to help develop critical thinking	<i>n</i>	%
Real-life Examples	74	98.7
News Articles	74	98.7
Journal Articles	72	94.7
Videos	72	94.7
Documentaries	64	85.3
Podcasts	60	81.1
Books	55	74.3

TOK Support Materials and Teaching Strategies: Qualitative Findings

The TOK teachers explained the ways they helped to develop students' CT skills in TOK course during the interviews. In general, the responses mirrored those that were mentioned in the questionnaire, although one participant did not prefer debates as they were like competitions. The teachers used self-reflection, questioning, text resources, and other ways such as videos, images, peer-review, making posters, and Socratic seminars to develop students' CT skills. For instance, Teacher E said, *“Highlighting 12 key concepts for students to analyse and criticise. Also, making posters and presentations about these concepts, knowledge question discussions to interpret and redefine, finding multiple meanings, and Socratic seminars, not debates, as they are like competitions.”* Teacher F also said, *“I have students read and write a lot, resources from a textbook and other resources from an outer textbook, asking a lot of questions, and reflective writing-response papers*

about questions besides videos and images. Teacher A also said, “Self-reflection, case studies, photographs for students to compare and contrast, peer review, mock exhibitions, real-life examples, journal articles, TED talks, podcasts, documentaries, videos, and clip art.”

At the time of the interviews, generative AI programs (genAI) such as ChatGPT were just being launched; this may explain why genAI was not mentioned more often. Teacher D did express concern about AI, *“I am reluctant to use resources, as students can plagiarise and lose their creativity when they use AI. Promoting students to question rather than give answers is more effective such as Devil’s advocate, real-life scenarios.”* Teacher D also stated that artificial intelligence could be a handicap for students to plagiarise and lose their creativity, so he also did not want his students to use it.

TOK Teachers’ Perceived Self-Efficacy for Developing Critical Thinking: Quantitative Results of Self-Efficacy Levels of TOK Teachers Regarding Developing Critical Thinking

In the questionnaire, teachers were asked 17 questions regarding their perceived self-efficacy and developing critical thinking in their teaching. Their responses can be found in Table 4. Overall, teachers agreed or strongly agreed ($M = 66.51$; $SD = 10.06$) that they are able to support students’ CT development. Teachers appear to feel confident in finding activities and organising their courses. It is interesting to note that 22 teachers were neutral regarding their knowledge of developing students’ CT; however, the mean response was still positive. A post hoc comparison (non-parametric t-test) of TOK teachers working in and outside of Türkiye was conducted to learn if there were any differences in perceived SE

between these two groups. The results show that there is no significant difference between the SE levels of the Turkish and non-Turkish teachers.



Table 4*The Self-Efficacy Means of TOK Teachers in Teaching Thinking Skills. (N=77)*

Questions	SD	D	N	A	SA	N	M	SD
1) I am able to find activities for my TOK classes that are related to teaching thinking skills.	-	n=6; 7.8%	n=5; 6.5%	n=43; 55.8%	n=23; 29.9%	77	4.08	0.823
2) I can organize the TOK course to teach critical thinking skills.	-	n=1; 1.3%	n=10; 13.0%	n=43; 55.8%	n=23; 29.9%	77	4.14	0.683
3) I can apply assessment techniques which make assessing thinking skills possible.	-	n=2; 9.1%	n=3; 13.0%	n=42; 54.5%	n=18; 23.4%	77	3.92	0.855
4) I can prepare classroom activities for teaching thinking skills.	-	n=4; 5.2%	n=10; 13.0%	n=42; 54.5%	n=21; 27.3%	77	4.04	0.785
5) I know what to do to improve thinking skills of the students who have difficulty in learning them.	n=1; 1.3%	n=11; 14.3%	n=22; 28.6%	n=30; 39.0%	n=13; 16.9%	77	3.56	0.980
6) I am able to cope with the problems which may occur during the process of teaching thinking skills.	n=1; 1.3%	n=6; 7.8%	n=10; 13.0%	n=43; 55.8%	n=17; 22.1%	77	3.90	0.882
7) I can design activities to improve self-learning abilities of students instead of teaching them.	-	n=6; 7.8%	n=11; 14.3%	n=42; 54.5%	n=18; 23.4%	77	3.94	0.833
8) I cite real life situations (RLS) to teach thinking skills.	-	0.00	n=3; 5.2%	n=37; 48.1%	n=36; 46.8%	77	4.42	0.593

Questions	SD	D	N	A	SA	N	M	SD
9) I know how to evaluate/assess improvement of students' thinking skills.	-	n=2; 7.8%	n=10; 13.0%	n=47; 61.0%	n=14; 18.2%	77	3.90	0.788
10) I know how to motivate students to think critically.	-	n=4; 5.2%	n=11; 14.3%	n=48; 62.3%	n=14; 18.2%	77	3.94	0.732
11) I know what components are required during improvement of students' thinking skills.	-	n=7; 9.1%	n=25; 32.5%	n=34; 44.2%	n=11; 14.3%	77	3.64	0.842
12) I can arrange activities intended to improve higher order thinking skills.	-	n=4; 5.2%	n=12; 15.6%	n=44; 57.1%	n=17; 22.1%	77	3.96	0.768
13) I know which activities improve critical thinking skills.	-	n=5; 6.5%	n=16; 20.8%	n=42; 54.5%	n=14; 18.2%	77	3.84	0.796
14) I have adequate knowledge of thinking skills.	-	n=8; 10.4%	n=12; 15.6%	n=38; 49.4%	n=19; 24.7%	77	3.88	0.903
15) I feel competent to determine what thinking skills are.	-	n=8; 10.4%	n=13; 16.9%	n=41; 53.2%	n=15; 19.5%	77	3.82	0.869
16) I have adequate experience on how to promote attainment of thinking skills given in TOK.	-	n=8; 10.4%	n=16; 20.8%	n=37; 48.1%	n=16; 20.8%	77	3.79	0.894
17) I have adequate knowledge on how to promote attainment of thinking skills given in TOK.	-	n=6; 7.8%	n=22; 28.6%	n=34; 44.2%	n=15; 19.5%	77	3.75	0.861

Note. SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree, SD: Standard Deviation, M: Mean

Relationship between Self-Efficacy Levels and Selected Independent Variables

The mean response to teachers' perceived SE in developing CT was related to a variety of independent variables that are listed in the research question. The results of the analysis can be found in Table 5. Only the following two variables had a significant relationship.

- The highest degree they earned
- Their self-perception about the IB training they have taken for developing students' critical thinking skills

The effect size of *the highest degree that the TOK teachers earned* was stronger than *teachers' self-perception about the IB training they have taken for developing students' CT skills*. This result shows that although significant, the high standard deviation affects the strength of teachers' perception about their IB training influencing their SE regarding CT.

No significant relationships were found for the remaining independent variables ($p > .05$). It was interesting that years of teaching experience in general and TOK, in particular, was not a significant contributor according to the quantitative results.

Table 5

Relationship between Self-Efficacy Levels and Selected Independent Variables

Predictors	Unstandardized B	SE	β	p
Years of experience in teaching TOK	2.026	1.205	.210	.098
Years of experience in teaching in general	-1.175	2.507	-.065	.641
Major	.555	2.758	.025	.841
The highest degree TOK teachers have earned	-5.948	2.828	-.268	.040*
TOK training	.882	3.750	.029	.815

Predictors	Unstandardized B	SE	β	p
Their self-perception about IB professional development prepared them to develop students' critical thinking skills.	2.917	1.359	.279	.036*
Professional development opportunities for developing critical thinking	-3.682	2.687	-.180	.176
IB training	-1.356	4.388	-.040	.758

*p<.05

TOK Teachers Perceived Self-Efficacy for Developing Critical Thinking:

Qualitative Findings

The teachers' self-reporting in quantitative findings did not demonstrate any link between teachers' SE and a number of independent variables. However, their verbal statements implicitly demonstrated that their experience in teaching TOK is related to their SE because they could see students' development over time. Moreover, they could implement different methods when necessary. Also, the IB professional development workshop on critical thinking skills was effective, as the quantitative results showed. The participants believed that many other techniques and training would make a difference in their teaching CT skills. Apart from these, one of the participants stated,

I don't feel like there's a lot of critical thinking in Category 1 TOK training, a lot of analysing or a lot of reflecting in the first category, but in the second one, where you have to talk to other teachers, let's say, about what practices they've done so far or what's courses they've thought or how they approach TOK. It becomes more interactive and reflective.

As the quotation shows, the effect of TOK training on teaching CT skills might depend on the teachers' expectations and the workshop's content. In contrast

to TOK workshops, the IB participants perceived no effect in teaching CT skills and SE in quantitative and qualitative findings.

During the interviews, the TOK teachers were asked whether they thought they succeeded in improving students' CT skills in their TOK courses and how they knew it. Although not all of them said "yes" explicitly, they explained that they could understand how their students improved their CT skills over time. The participants expressed that the teachers' success could be seen via the development of CT skills of students, such as from their exam papers, their way of questioning, their involvement in case studies, peer evaluation, justifying their claims in the exam papers, explaining their arguments, exhibitions, reflective writings, essays, end-of-year assessments, and group discussions throughout the year. However, the teachers highlighted that there would always be some students who could not develop their CT skills as expected.

Unlike the majority, one TOK teacher explained that he did not consider himself successful in teaching CT skills as he believed that the school system must also support the development of CT skills in students. He also shared that the IB programme let students pass the course, not himself, without developing their CT skills. For this reason, he explained that he used pre-test and test methods, allowing him and the students to see their weaknesses and accurately evaluate their CT skills.

Furthermore, the TOK teachers were asked about what would make their teaching CT skills more effective. According to their responses, more professional development, reading papers, critical reading, applying different methods and techniques, attending seminars, preparing an exhibition or writing essays like students to prepare them to teach better. Moreover, following educational blogs, talking to other TOK teachers, more real-life situations, evaluating prior lessons,

differentiation, flipped classroom, and collective teacher efficacy besides cross-curriculum design for teachers, and more time for teaching TOK were the ideas to improve better teaching CT skills in TOK course. Also, the teachers stated that they needed more time to develop themselves, as a two-hour TOK class was inadequate.

Is CT integral to the goal of TOK course?

The majority of the participants strongly agreed ($n = 48$; 65.8% that CT is integral to the goal of TOK course, while only two of them strongly disagreed. Although it was not surprising to learn that teachers perceive CT plays an important role in TOK lessons, there were a few negative or neutral comments among the participants.

The Extent Critical Thinking is Integral to TOK: Quantitative Results

The majority of the participants believed that CT is an integral goal of TOK course, although two people chose *strongly disagree* and only four of them opted for *neutral*.

The Relation between Perceived Self-Efficacy and Perceptions of Critical Thinking and TOK

This question requires a correlation analysis to understand whether the TOK teachers' self-efficacy relates to their belief that CT is essential in TOK course aims. The sig value showed .010 and it was smaller than .05 besides the correlation coefficient value is 0.30 which displayed a positive correlation. Therefore, the correlation results showed that the TOK teachers' agreement on the importance of CT in TOK course was also related to their level of SE despite not being so strong. The results are shown in Table 6.

Table 6

The Correlation Results on Teachers' SE and Their Self-Perception of the Importance of CT as a Goal of a TOK Course

Spearman's rho SE	Correlation Coefficient	<i>p</i>	<i>N</i>	<i>M</i>	<i>SD</i>
To what extent do you agree CT is integral to the goal of a TOK course?	.30	.010*	77	4.52	.835

* $p < .05$

Critical Thinking and TOK: Qualitative findings

During the interviews, another open-ended question was the reason why TOK teachers thought that CT was integral to the goal of TOK course. The participants emphasised that TOK helps students to question and evaluate knowledge claims, develop cognitive skills, strengthen their reflection skills, and encourage them to be open-minded. Moreover, the teachers explained that TOK focuses on “What do we know and how do we know?” which are integral in TOK so that students can think and understand the mediums of knowledge and different points of view. Another important point of the significance of CT is that students can learn to search for evidence for their arguments to eliminate contradictory information.

One teacher also believed that CT must be the centre of the course, not the areas of knowledge, themes or concepts, creating a class environment that pushed students to discuss where everyone felt free to speak.

The participants also explained why TOK course was integral to the goal of a TOK course by emphasising that it aims to encourage learners to inquire, question, reflect, create a response, and analyse. However, one interviewee believed that CT was not integral to TOK as a student could pass TOK anyway, and the benchmark was too low for the course. Therefore, it had the potential to be important, but it was

not. The other teachers did not share this view because they indicated that CT was the principal aim of the course, and the demand was high for students. They also added that students could not pass the course without writing a good TOK essay, indicating the importance of CT. For this reason, one TOK teacher complained about the limited time for TOK course as they needed more time to teach CT skills.

Conclusion

This chapter presented the research outcome in accordance with the research questions. The research questions' results were discussed through the sub-questions. This research includes mixed data collection and analysis tools; therefore, the answers to the research questions were expressed with the combination of the results. In the upcoming chapter, the discussions of the results via major and sub-findings will be addressed in line with major research questions and sub-questions.

CHAPTER 5: DISCUSSION

Introduction

This research aims to ascertain how TOK teachers integrate CT into their lessons. Furthermore, it investigated how perceived SE might affect their efforts to support students CT. To this end, the findings collected through explanatory research design are presented in this chapter.

Overview of the Study

In this study, the researcher applied mixed methods to investigate how TOK teachers implement critical thinking into their lessons and what kinds of materials and resources they employ for TOK course. Moreover, how TOK teachers' SE levels are related to a variety of independent variables was explored. The study included 77 TOK teachers who are living in Türkiye and abroad; therefore, this research occurred in an international context. These 77 teachers responded to a questionnaire that collected data regarding definitions of CT as well as resources and methods to develop CT. Participants were also asked to reply to items designed to assess their self-efficacy regarding developing students' thinking skills. In addition to the questionnaire responses, six teachers agreed to participate in a follow-up interview that provided qualitative data. These teachers are labeled Teacher A, B, C, D, E, and F.

Discussion of Major Findings

This research provided important findings in accordance with the research

questions, which could valuably contribute to the IBDP, TOK, CT and SE literature.

To this end, this chapter provides the major findings from the research and their connections to the related literature.

TOK Teachers' Definition of Critical Thinking has Many Components

The analysis of the study revealed that the TOK teachers define CT as a way of deep thinking. According to the participants, CT involves forming opinions and offering solutions through analysis, seeing different perspectives, justifying, synthesizing, criticizing, evaluating and questioning, and accordingly coming up with a solution or concluding idea. They emphasized the importance of questioning and keeping an open mind. As teacher F described:

Critical thinking is making insightful comments based on existing knowledge. It is not only saying or explaining what you see and what you recognize. It is also about going deeper by analyzing, examining, criticizing, and moving about the good sides and bad sides in a critical wheel aspect. Making a personal evaluation with evidence is also a part of critical thinking to find your own truth.

As noted in the results, many aspects of teachers' description of CT comply with the definition provided by Facione (1990) could be found. For instance, the TOK teachers featured some keywords while defining CT, such as analysis, seeing multiple perspectives, justification, synthesis, making a judgment, examination of knowledge, criticism, evaluation, being open-minded and questioning. Ensuring teachers understand and can define CT can ensure that it is supported effectively (Aliakbari & Sadeghdaghighi, 2012).

It is interesting to note that teachers' descriptions of CT are similar to descriptions of higher-order thinking skills found in Bloom's revised taxonomy

(Krathwohl, 2002, p. 215). Krathwohl (2002) showed the sub-keywords in each category in the revised taxonomy, and “understand” includes interpretation, inference and explanation, which can be seen in Facione’s (1990) and the teachers’ definitions of CT. Krathwohl also included “analyze” and “evaluate” in Bloom’s revised taxonomy, which are aligned with Facione’s (1990) and teachers’ CT definitions.

Other researchers have also found that teachers’ understanding of CT involves higher-order thinking skills as described by Facione and Bloom. Altun and Yildirim (2023) conducted a study to discover pre-service teachers’ definitions of cognitive structures and conceptual definitions who attended the course named Critical and Analytical Thinking. The pre-service teachers’ responses showed great similarity to Facione as they used words such as analysis, argument evaluation, assertions, evidence and explanation. Moreover, the teachers defined the CT skills with the words, knowing the complications of multiple views, problem-solving, making inferences through deductive and inductive reasoning (Facione, 1990), interpretation, explanation, and decision-making and being critical of the results (Altun & Yildirim, 2023). Likewise, Tuzlukova et al. (2017) conducted a study to explore the definition of CT and its importance with English language teachers in Oman via a survey. The results demonstrated that the teachers’ knowledge of the idea of CT was quite satisfactory. They affiliated CT with various words and statements, such as judging and opinion formation. However, they principally indicated that CT compromised analysis, evaluation, rationality, and reflection (Tuzlukova et al., 2017). Despite the rarity of research regarding the definition of CT by teachers in literature, these studies displayed that the current research results are relevant to the findings of other research studies.

TOK Teachers Encourage Students to Question and Collaborate to Foster Critical Thinking

When asked about the methods they use to support students' CT, teachers in this study reported that they used mostly open-ended questions and cooperative work. Reflective writing activities and debating were also popular strategies.

The findings are not surprising given the aim of TOK, which is to stimulate students' thinking skills through discussions, open-ended questions, reflective writing activities, organizing arguments, and cooperative work. To illustrate, when students cooperate, they need to be involved in an activity to evaluate or analyze problems together. Also, when students write a reflection, they need to explain and analyze their points. According to the results, teachers do not use role-playing and guest speakers that often for developing critical thinking. One reason for the low rating of these approaches might be the limited teaching time in TOK (only two hours in Türkiye in most schools).

Considering the approaches of TOK teachers employed to teach CT, some resemblances can be easily seen in teaching CT in general. For instance, Serenica et al. (2018) also explained the positive impact of the "guided inquiry model" on developing CT in students, which is very similar to questioning so that students can learn a topic by doing research and making explanations. Raslan (2022) discovered the significance of cooperative learning in teaching and learning CT. Similarly, Sinnewe et al. (2023) conducted a study with accounting students to stress the significance of CT skills. They found out that case studies, group and in-class discussions were effective in learning CT. The importance of effective questioning, engaging students in discussions that force them to think, and debates were also discovered by Itmeizeh and Hasan (2020) through their study with Palestinian

students. These studies demonstrate that teaching and learning CT require students' active engagement in an activity where they can discuss, research, work collaboratively, explain and justify their points.

In addition to the findings from the questionnaire, the teachers explained during the interviews that reflective writing, case studies, discussing multiple views, visuals and videos, supplementary texts, scoring past papers, Socratic seminars, keeping journals, giving tasks so that students can research, analyze and evaluate are very beneficial resources for students to develop CT in TOK. In contrast to what the majority explained, one teacher did not prefer debates as they were mostly competitions and limited students' argumentation. Teachers also stated that the lecture format did not work very well for students developing CT. As Dilekli and Yalçın found (2016), a teacher-centered approach limits students' learning CT, so teachers may prefer using fewer activities by following the traditional ones. Overall, the study found that teachers provide activities or assignments that help students think and question. For instance, teacher C said,

Case studies, discuss different viewpoints and have students come up with their own judgment. Also, giving students homework, which requires them to find information, research and evaluate, helps a lot to develop their CT. The lecture format does not work as they must take action to learn.

Teacher F also said: *"I help their development in CT by having students score past papers according to the given rubric, besides Socratic seminars, and keeping journals."*

When the participants were asked about resources they used to develop students' CT, the TOK teachers reported that they use news articles and real-life examples. Clearly, these resources help students examine their community and world

and help them gain different perspectives and insights. In addition to these written resources, teachers also spark students' interest through videos and internet resources. Notably, very few teachers mentioned using textbooks and this may be because the IB does not mandate using textbooks or they prefer to use their own materials.

Gaining insights into TOK teachers' practices regarding student CT development was a key motivator for the current study. There are limited studies that investigated this information and therefore, these findings address a gap in the literature. Findings from some studies do support the information learned in the current research. Bezanilla et al. (2019) ascertained that oral and written reflections, making arguments, reading, case studies and synthesizing and analyzing resources, regardless of the concepts in teaching CT. In line with the findings of this study, Zivkovic (2016) discovered that class discussions and letting students think about real-life situations by giving context help them develop CT and hone the quality of their knowledge besides applying their previous knowledge to novice occasions. Another study conducted by Powley and Taylor (2014) also discovered that making posters fostered students' CT because they shared their arguments and reasons, which made their analyses legitimate. As a result, the students' CT skills improved due to exchanging ideas and seeing multiple views.

Education and IB Professional Development May Affect Teachers' Self-Efficacy for Developing Students' Critical Thinking

The results revealed that the teachers' SE was statistically significant in terms of the highest degree they have earned and to a lesser extent, their self-perception about the IB training they have taken for developing students' CT skills. It is not surprising that the teachers' ability to teach CT is better when their education level

increases, as they can also gain or improve their higher-order thinking skills by enhancing their intellectual and academic knowledge. Teachers' professional development in IB is part of their education, so it is not surprising this variable may be an influencing factor. As teachers gain experience in learning about how to develop students' CT, they gain more confidence in the effectiveness of their teaching practice. This insight is supported by a comment provided by teacher B:

I believe that at least, 40-50% of students develop their CT skills in my TOK lessons. Especially in the finals, the students come up with very well-developed answers by justifying their arguments. I can see their development through time as they learned to justify their claims, which they could not do at the beginning

Teacher C also explained,

Yes, I am successful. Some students really want to learn, although some stay stable and show no development. I know it, especially in the second half of grade 11, when they start questioning and engaging in case studies. I can see those critical skills coming into light out there explaining their thoughts.

The importance of professional development in CT is supported in other studies. For instance, Aliakbari and Sadeghdaghighi (2013) discovered that when teachers were not knowledgeable about teaching CT and which resources to use to teach it, they could not integrate CT into their lessons. Alternatively, Yalçın and Dilekli (2016) reported that teachers with professional development were more confident in facilitating student-centered learning strategies that encouraged students to think critically.

It is also important to point out that teachers explained it would be better if they had more opportunities to receive professional development in CT. The

interviewees identified a variety of ways they try to independently enhance their competencies in supporting students' CT. They read papers, follow blogs about TOK, talk to other TOK teachers, and strive to continually improve their lessons.

The teachers indicated, however, they would be more successful at supporting students' CT if they had more class time. As teacher F highlighted,

More time is needed for TOK to teach CT. IB should take the course more seriously, as two hours is not enough to teach it effectively. Also, a better rubric should be provided for evaluation. I think spending more time developing TOK or integrating the ideas and objectives of TOK into the entire programme would be better than having it as a separate course.

Teacher A also stated,

More professional development based on CT skills is necessary for teaching CT in TOK, including reading more papers regarding the implementation of CT. Moreover, teachers should step back and become students to create a real exhibition so that they can create a connection between themselves and students. This also helps teachers to reflect on what they already know, so show their analysis skills.

The need for more time for TOK can be inferred from the study by Dilekli and Tezci (2018). They uncovered that when teachers had fewer activities in class to teach CT, they had lower SE as they were unwilling to try new resources or approaches.

The TOK Teachers Strongly Agreed That Critical Thinking Is Integral to The Goal of TOK Course

The results demonstrated that CT is a vital element to the goal of TOK course. The teachers explained that CT encourages TOK students to question and

develop higher-order thinking skills, which is the main aim of the course. To illustrate, Teacher A said, *“Assessing, evaluating, creating a response besides reflecting their own values are important.”* Teacher B added, *“Although TOK includes basic knowledge like theories, claims and different approaches, the majority of the course requires CT skills.”* Hughes (2014) also found that TOK intended to promote CT, but commented more work is needed. Bergeron and Rogers (2019) investigated the perspectives of the TOK teachers in a global context. In addition to developing students' interdisciplinary understanding, their study featured that developing students' CT skills was important. The participants explained the benefits of TOK, which were being able to evaluate knowledge more efficiently and reflecting their own opinions and beliefs.

The positive correlation between TOK teachers' perceived SE and their opinions about CT in TOK is also worth considering. Perhaps when teachers aim to improve students' CT they examine their practice and gain an understanding of their effectiveness. Davies and Willing (2023) showed that the teachers' beliefs and perceptions about CT affect their pedagogical practices. Improving their practice can affect their SE.

Implications for Practice

This study found that having qualified and well-educated teachers will better ensure students have the opportunity to develop their CT. This study discovered that understanding what critical thinking is and learning how to support it through teaching methods and resources is important. Teaching CT is a process that requires teachers to use different approaches to integrate CT into class because each student has different learning and understanding. Therefore, it is important to note that the TOK teachers used various approaches and materials, which shows that the teachers

benefited from the flexibility the IBDP offered them and used differentiation to provide independence for learners.

This study's findings regarding professional development and SE regarding student CT development are vital. When teachers develop their academic and intellectual knowledge, they can be more successful in recognizing what their students need to think critically. Furthermore, when teachers support students' learning CT by using appropriate and effective methods and techniques, they help students engage in classroom activities and ignite their curiosity so that they can think critically. To teach CT successfully, teachers must know how to develop themselves in teaching CT by taking IB professional development, and accordingly, they can use the best techniques, approaches and resources.

Knowing teachers' perceived SE and the significance of CT in TOK is vital, especially for teachers who have low perceived SE. The school administration can provide them with professional development training and they can boost their SE and their ability in teaching CT. In this way, the quality of TOK course or teaching CT in general can rise. Moreover, the post hoc analysis comparing foreign to Turkish teachers indicates that there is no difference statistically found significant when the Turkish and non-Turkish teachers' SE level was compared.

The results showed that the teachers need more time to teach CT in TOK, they should take professional development opportunities offered by IB and they should have many resources and guidance to develop their teaching in teaching CT in TOK. Although IB provides a guide for TOK, the majority of the work depends on TOK teachers. How they develop themselves and how their school environment supports them is still unclear. Consequently, TOK teachers must be augmented by

resources and professional development opportunities, particularly offered by IB as this research indicates.

Implications for Future Research

This research featured the implementation of CT into TOK courses and how the self-efficacy of TOK teachers played a role in implementing CT. The researcher particularly focused on the materials, resources and the teachers' perceived SE, but the motivation behind the teachers' teaching CT effectively was not examined. For this reason, future researchers may find the motivation behind teaching and the desire to learn CT besides how teachers develop themselves in teaching CT in TOK or different courses. Moreover, what might be the challenges and difficulties in implementing CT into TOK might be another topic that is worthy of investigating. Future researchers can also discover how students develop their CT in TOK and how they use their CT skills in other subjects. This study included Turkish and foreign TOK teachers, while some insights were provided regarding differences in the SE perceptions of these two populations, further research could be conducted to explicitly compare, analyze, and interpret the perceived SE of Turkish teachers to those working in different regions of the world. Lastly, classroom observations can provide valuable insights into how teachers develop CT in TOK course.

Limitations

There are some limitations in this research. Firstly, the sampling data was relatively small considering the international context of the research. Secondly, there is not much research on teaching CT in TOK and SE of teachers in teaching CT to support the results. Thirdly, we do not know the main motivation behind the teachers' SE in teaching CT; therefore, this research essentially focused on the

resources and approaches of the TOK teachers. Consequently, the knowledge was limited regarding SE and CT in TOK.

Considering the international context of this study, the sample size was not so extensive as 77 of the answers were investigated out of 103 participants due to incomplete answers in the questionnaire. Therefore, the researcher could have got various data if there had been more participants. Especially, it would be good to have more participants to understand the relation between the mentioned variables and the teachers' SE in teaching CT.

Also, this research aimed to discover how teachers' level of SE was related to their teaching of CT in TOK courses; however, there is no research which directly investigated the relationship between teachers' SE and teaching CT in TOK. As a result, the researcher could not support herself with much research to provide validity of the findings in some parts of the study.

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APPENDIX A

İhsan Doğramacı Bilkent University Ethics Permission



Bilkent Üniversitesi
Akademik İşler Rektör Yardımcılığı

Tarih : 11 Eylül 2022

Gönderilen : İhsan Doğramacı, Rektör Yardımcısı

Tez Danışmanı : İhsan Doğramacı

Gönderen : Dr. Öğr. Üyesi
İhsan Doğramacı, Rektör Yardımcısı

Konu : "The Implementation ..." çalışması etik kurul onayı

Üniversitemiz İnsan Araştırmaları Etik Kurulu, 11 Eylül 2022 tarihli görüşme sonucu, "The Implementation of Critical Thinking into Theory of Knowledge Lessons: Teachers' Perspectives and Practices" isimli çalışmanız kapsamında yapmayı önerdiğiniz etkinlik için etik onay vermiş bulunmaktadır. Onay, ekte verilmiş olan çalışma önerisi, çalışma yürütücüler ve bilgilendirme formu için geçerlidir.

Bu onay, yapmayı önerdiğiniz çalışmanın genel bilim etiği açısından bir değerlendirmedir. Çalışmanızla, kurumunuzun değerlendirmesi dışında kalabilen özel etik ve yasal sınırlamalara uymakla ayrıca yükümlüsünüz.

Kovid-19 salgını nedeniyle konulmuş olan kısıtlamaların yürürlükte olduğu süre içinde, tüm komite toplantıları elektronik ortamda yapılmaktadır; aşağıda isimleri bulunan Bilkent Üniversitesi Etik Kurulu Üyeleri adına bu yazıyı imzalama yetkisi kurul başkanındadır.

Etik Kurul Üyeleri:

Önvan / İsim	Bölüm / Uzmanlık	
Prof. Dr. Dr. Öğr. Üyesi	Bilgisayar Mühendisliği	Başkan
Prof. Dr. Öğr. Üyesi	Hukuk	Üye
Prof. Dr. Öğr. Üyesi	Elektrik ve Elektronik Müh.	Üye
Doç. Dr. Öğr. Üyesi	Moleküler Biyoloji ve Genetik	Üye
Dr. Öğr. Üyesi	Psikoloji	Üye
Dr. Öğr. Üyesi	İletişim ve Tasarım	Yedek Üye
Dr. Öğr. Üyesi	Hukuk	Yedek Üye

Kurul karar/toplantı No: 2022_09_11_02

Bilkent Üniversitesi, 06800 Bilkent, Ankara • Telefon: (312) 290 12 13 • (312) 290 12 14 • Faks: (312) 264 41 52

APPENDIX B

Ministry of National Education of Türkiye: The Ethics Permission



T.C.
MİLLÎ EĞİTİM BAKANLIĞI
Strateji Geliştirme Başkanlığı

Sayı : E-49614598-605.01-70303334
Konu : Araştırma Uygulama İzin Talebi

13.02.2023

DAĞITIM YERLERİNE

İlgi: a) Bakanlığımızın 21/01/2020 tarihli ve 2020/2 Nolu Araştırma Uygulama İzinkeri Genelgesi.
b) İhsan Doğramacı Bilkent Üniversitesi Rektörlüğünün 19/01/2023 tarihli ve E-66319886-605.01-1017 sayılı yazısı.

İlgi (b) yazı ile İhsan Doğramacı Bilkent Üniversitesi Eğitim Bilimleri Enstitüsü Eğitim Programları ve Öğretim Yüksek Lisans Programı öğrencisi İrem GÖNEN'in, "Eleştirel Düşünme Becerisinin Bilgi Kuramı Dersine Entegre Edilmesi: Öğretmenlerin Bakış Açuları ve Yaklaşımları" konulu araştırmasına veri sağlamak amacıyla görüşme ve anket çalışması yapma izin talebine ilişkin ilgi yazı ve ekleri Bakanlığımız tarafından incelenmiştir.

Bakanlığımıza bağlı resmi/özel okul ve kurumlarda öğretmenlerin katılımıyla yapılması planlanan uygulamanın denetimi il/ilçe milli eğitim müdürlükleri ve okul/kurum idaresinde olmak üzere, kurum faaliyetlerini aksatmadan, gönüllülük esasına göre; onaylı bir örneği Bakanlığımızda muhafaza edilen ve uygulama sırasında da mühürlü ve imzalı örnekten çoğaltılan, veri toplama araçlarının <http://meb.ai/ueDXmO> adresinden online olarak uygulanmasına ilgi (a) Genelge doğrultusunda izin verilmiştir.

Gereğini bilgilerinize rica ederim.

Mehmet Fatih LEBLEBİCİ
Bakan a.
Başkan

Ek:
1-Onaylı Veri Toplama Araçları (11 Sayfa)
2-Okul Listesi (2 Sayfa)

Dağıtım:
Gereği:
Ankara, Antalya, Bahçeşehir, Bursa, Erzurum,
Eskişehir, Gaziantep, İstanbul, Mersin, İzmir,
Kocaeli ve Muğla Valiliğine
(İl Millî Eğitim Müdürlüğü)

Bilgi:
İhsan Doğramacı Bilkent Üniversitesi Rektörlüğüne

Bu belge güvenli elektronik imza ile imzalanmıştır.

Adres : Bülge Dağıtım Adresi: <https://www.mek.gov.tr/meh-ehya>
Tebliğ No : Bülge Kısım
E-Posta : Uzman : Millî Eğitim Uzmanı
Kep Adresi : meh@milli.gov.tr İnternet Adresi : Pda :
Bu belge güvenli elektronik imza ile imzalanmıştır. <https://mek.gov.tr/meh-ehya> 2ba6-59f4-39ca-987d-bb59 koduyla teyit edilebilir.

APPENDIX C

The Questionnaire

The name of the Research: The Implementation of Critical Thinking into Theory of Knowledge Lessons: Teachers' Perspectives and Practices Questionnaire

I have read and I understand the consent form included in the email.

I consent to participate in this survey. ☐ YES. ☐ NO

Part 1: Demographic Information

1) How many years of experience do you have in teaching TOK?

☐ 0-2

☐ 3-5

☐ 6-8

☐ 9+

2) How many years of experience do you have in teaching in general?

☐ 0-2

☐ 3-5

☐ 6-8

☐ 9+

3) Which country do you work in?

4) What is your gender?

Female

Male

5) What was your major?

English Language Teaching

English Language and Literature

Translation and Interpretation

Biology

Biology Teaching

Chemistry

Chemistry Teaching

Mathematics

Mathematics Teaching

Physics

Physics Teaching

Philosophy

Other (please specify.....)

6) What is the highest degree you have earned?

Bachelor's

Master's

PhD

7) What grade do you teach?

BDP Year 1

IBDP Year 2

Both

8) Which of the following IB professional development opportunities have you attended?

- ☐ Category 1 TOK workshop
- ☐ Category 2 TOK workshop
- ☐ Category 3 TOK workshop
- ☐ IB Certificate in Teaching and Learning (IB Educator Certificate offered by universities)
- ☐ IB advanced certificate in teaching and learning research (IB Educator Certificate offered by universities)
- ☐ None of the above
- ☐ Other (please specify) _____

9) To what extent do you agree that your IB professional development prepared you for developing students' critical thinking?

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
--------------------------	-----------------	------------------	--------------	-----------------------

1	2	3	4	5
---	---	---	---	---

10) Have you done any professional development focused on critical thinking skills?

☐ Yes (please describe:

.....)

☐ No

Part 2: The definition of Critical Thinking

1) Please write your own definition of critical thinking below:

2)) Please indicate the extent to which you agree with each of the following definitions of critical thinking.

	Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
“reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p. 45).					
“skillful, responsible thinking that facilitates good judgment because it 1) relies upon criteria, 2) is self-correcting, and 3) is sensitive to context” (Lipman, 1988, p. 39).					

“purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based” (Facione, 1990, p. 3).					
“thinking that is goal-directed and purposive, thinking aimed at forming a judgment,” where the thinking itself meets standards of adequacy and accuracy” (Bailin et al., 1999b, p. 287).					

2) To what extent do you agree CT is integral to the goal of a TOK course?

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Please explain your response in the space below.

--

Part 3: Critical Thinking Approaches

Below is a list of approaches typically used to help students develop their critical thinking. Please check **YES** or **NO** to indicate the ones you use in your classes.

Critical Thinking Approaches	Yes	No
Reflective writing activities		
Cooperative work		
Inquiry Statements		
Problem based learning		
Case study		
Oral presentations		
Role-play		
Debates		
Project-Based Learning		
Mock Exhibition		
Short Essays		
Guest Speakers		
Open-Ended Questions		
Socratic Dialogue		
Self – Evaluation/Reflective Essays		
Please list any other approaches you use different than the ones listed above:		

Part 4: Resources for teachers

Below is a list of resources typically used to help students develop their critical thinking. Please check **YES** or **NO** to indicate the ones you use in your classes.

Resources to help develop critical thinking		
---	--	--

	Yes	No
Journal Articles		
Books		
News articles		
Podcasts		
Documentaries		
Videos		
Real-life examples		
Please list any other resources you use different than the ones listed above:		

Part 5: Developing students' thinking skills

The following questions are designed to gain insights into your teaching practice related to developing thinking skills – specifically, **critical** thinking skills. Please answer the extent to which you agree with each statement. These items are used with permission from Dilekli & Tezci (2018).

1. I am able to find activities for my TOK classes that are related to teaching thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
2. I can organize the TOK course to teach critical thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
3. I can apply assessment techniques which make assessing thinking skills possible.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
4. I can prepare classroom activities for teaching thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5

5. I know what to do to improve thinking skills of the students who have difficulty in learning them.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
6. I am able to cope with the problems which may occur during the process of teaching thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
7. I can design activities to improve self-learning abilities of students instead of teaching them.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
8. I cite real life situations (RLS) to teach thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
9. I know how to evaluate/assess improvement of students' thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
10. I know how to motivate students to think critically.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
11. I know what components are required during improvement of students' thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
12. I can arrange activities intended to improve higher order thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
13. I know which activities improve critical thinking skills.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
14. I have adequate knowledge of thinking skills.				

Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
15. I feel competent to determine what thinking skills are.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
16. I have adequate experience on how to promote attainment of thinking skills given in TOK.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5
17. I have adequate knowledge on how to promote attainment of thinking skills given in TOK.				
Strongly disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly agree 5

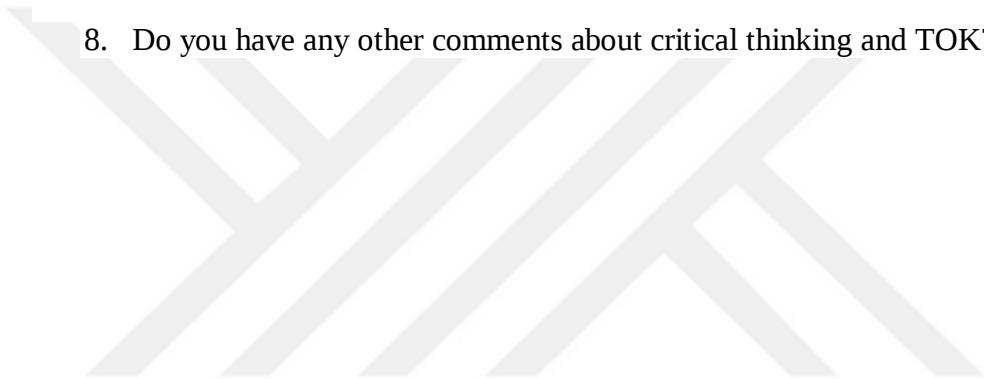
APPENDIX D

The Follow-Up Questions

Interview questions regarding critical thinking in TOK lessons

Thank you for agreeing to participate in this interview. We are conducting these interviews to follow up on responses to some of our survey questions.

1. To begin, please share with me your definition of critical thinking.
2. In the questionnaire, most of the respondents agreed with the following definition of critical thinking. Do you agree with this definition? Why do think it was chosen over the other definitions?
 - “Reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p.45).
 - 41 of the participants agree
 - 20 participants strongly agree
 - “Skilful, responsible thinking that facilitates good judgment because it 1) relies upon criteria, 2) is self-correcting, 3) is sensitive to context” (Lipman, 1988, p.39).
 - 39 people agree
 - 21 people strongly agree
 - “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based” (Facione, 1990, p. 3).
 - 35 people agree
 - 31 people strongly agree
 - “thinking that is goal-directed and purposive, thinking aimed at forming a judgment,” where the thinking itself meets standards of adequacy and accuracy” (Bailin et al., 1999b, p. 287).
 - 30 people agree
 - 19 people are neutral
 - 14 people strongly agree
3. When we asked teachers the extent to which they think CT is integral to TOK, the percentage of the responses was. Do these results reflect your opinion? Please explain your response.
 - 53.4 % of the participants chose “strongly agree”, indicating that CT is an integral part of the TOK course. Also, 22.3 % of them chose “agree”, indicating that CT is an integral part of the TOK course.

4. Would you please describe ways you have tried to support students' critical thinking skills as part of TOK? [If not mentioned by the teacher, ask about specific approaches and resources].
 5. Which approaches to supporting students CT in TOK were most successful? Why? Which do you think didn't work well? Why? [Possible follow-up: Do you have plans to make any improvements or add to your teaching strategies?]
 6. Do you believe you are successful at improving students' CT in your TOK courses? How do you know?
 7. What would help make your CT teaching skills more effective? [Possible follow-up questions: What should professional development for TOK teachers include to help ensure CT is part of TOK? Do you have recommendations to improve CT in TOK in general?]
 8. Do you have any other comments about critical thinking and TOK?
- 

APPENDIX E
Frequencies and Means

Section 1

N= 77 for each of the items

1) How many years of experience do you have in teaching TOK?

1. 0 to 2 years
(n=26; 33.8%)
2. 3 to 5 years
(n=29; 37.7%)
3. 6 to 8 years
(n=13; 16.9%)
4. 9 years and above
(n=9; 11.7%)

2) How many years of experience do you have in teaching in general?

1. 0 to 2 years
(n=0; 0%)
2. 3 to 5 years
(n=7; 9.1%)
3. 6 to 8 years
(n=7; 9.1%)
4. 9 years and above
(n=63; 81.8%)

3) If you are working outside of Turkey, please let us know which country do you live in?

4) What is your gender?

1. Male (n=34; 45.3%)
2. Female (n=41; 54.7%)
3. Do not want to share (n=2; 2.6%)

5) What was your major?

1. English Language Teaching
(n=15; 19.5%)
2. English Language and Literature
(n=23; 29.9%)
3. Translation and Interpretation
(n=1; 1.3%)
4. Biology
(n=4; 5.2%)
5. Chemistry Teaching
(n=2; 2.6%)
6. Mathematics
(n=3; 3.9%)
7. Mathematics Teaching
(n=1; 1.3%)
8. Physics
(n=1; 1.3%)
9. Philosophy
(n=7; 9.1%)
10. Other:
(n=20; 26.0 %)

6) What is the highest degree you have earned?

1. Bachelor's
(n=21; 27.3%)
2. Master's
(n=48; 62.3%)
3. PhD
(n=8; 10.4%)

7) What grade do you teach?

1. IBDP Year 1
(n=6; 7.8%)
2. IBDP Year 2
(n=1; 1.3%)
3. Both
(n=70; 90.9%)

8) Which of the following IB professional development opportunities have you attended?

1. Category 1 TOK Workshop
(n=40; 51.9%)
2. Category 2 TOK Workshop
(n=40; 51.9%)
3. Category 3 TOK Workshop
(n=18; 23.4%)
4. IB Certificate in Teaching and Learning (IB Educator Certificate offered by universities)
(n=4; 5.2%)

5. IB Certificate in Teaching and Learning Research (IB Educator Certificate offered by universities)

(n=4; 5.2%)

6. None of the above

(n=7; 9.1%)

7. Other

(n=7; 9.1%)

- 9) To what extent do you agree that your IB professional development prepared you for developing students' critical thinking? Mean=3.70 SD=.904

1. Strongly disagree (n=3; 3.9%)

2. Disagree (n=2; 2.6%)

3. Neutral (n=22; 28.6%)

4. Agree (n=38; 49.4%)

5. Strongly agree (n=12; 15.6%)

- 10) Have you done any professional development focused on critical thinking skills? M=1.55 SD=.501

1. Yes (n=35; 45.5%)

2. No (n=42; 54.5%)

Section 2

- 1) Please write your own definition of critical thinking
- 2) Please indicate the extent to which you agree with each of the following definitions of critical thinking.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	1	2	3	4	5
“reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p. 45).	(n=3; 3.9%) M=1.00	(n=5; 6.5%) M=1.00	(n=13; 16.9%) M=1.00	(n=34; 44.2%) M=1.00	(n=18; 23.4%) M=1.00
“skilful, responsible thinking that facilitates good judgment because it 1) relies upon criteria, 2) is self-correcting, and 3) is sensitive to context” (Lipman, 1988, p. 39).	(n=1; 1.3%) M=1.00	(n=1; 1.3%) M=1.00	(n=11; 14.3%) M=1.00	(n=36; 46.8%) M=1.00	(n=19; 24.7%) M=1.00
“purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based”	(n=1; 1.3%) M=1.00	-	(n=6; 7.8%) M=1.00	(n=31; 40.3%) M=1.00	(n=28;36.4%) M=1.00

(Facione, 1990, p. 3).					
“thinking that is goal-directed and purposive, thinking aimed at forming a judgment,” where the thinking itself meets standards of adequacy and accuracy” (Bailin et al., 1999b, p. 287).	-	(n=8; 10.4%) M=1.00	(n=18; 23.4%) M=1.00	(n=25; 32.5%) M=1.00	(n=14; 18.2%) M=1.00

3) To what extent do you agree CT is integral to the goal of TOK course?

M=4.52 SD=.835

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5
(n=2; 2.7%)	-	(n=4; 5.5%)	(n=19; 26.0)	(n=48; 65.8%)

Section 3

Below is a list of approaches typically used to help students develop their critical thinking. Please check **YES** or **NO** to indicate the ones you use in your classes.

Critical Thinking Approaches	Yes	No
Reflective writing activities	(n=72; 93.5%) M=1.06 SD=.248	(n=5; 6.5%)
Cooperative work	(n=72; 94.7%)	(n=4; 5.3%)

	M=1.05 SD=.225	
Inquiry Statements	(n=68; 89.5%) M=1.11 SD=.309	(n=8; 10.5%)
Problem based learning	(n=56; 75.7%) M=1.24 SD=.432	(n=18; 24.3%)
Case study	(n=55; 73.3%) M=1.27 SD=.445	(n=20; 26.7%)
Oral presentations	(n=62; 81.6%) M=1.18 SD=.390	(n=14; 18.4%)
Role-play	(n=40; 55.6%) M=1.44 SD=.500	(n=32; 44.4%)
Debates	(n=67; 90.5%) M=1.09 SD=.295	(n=7; 9.5 %)
Project-Based Learning	(n=45; 62.5%) M=1.38 SD=.488	(n=27; 37.5%)
Mock Exhibition	(n=62; 83.8%) M=1.16 SD=.371	(n=12; 16.2%)
Short Essays	(n=67; 87.0%) M=1.13 SD=.338	(n=10; 13.0 %)
Guest Speakers	(n=31; 42.5%) M=1.58 SD=.498	(n=42; 57.5%)
Open-Ended Questions	(n=72; 94.7%) M=1.05 SD=.225	(n=4; 5.3%)
Socratic Dialogue	(n=51; 68.0%) M=1.32 SD=.470	(n=24; 32.0%)

Self – Evaluation/Reflective Essays	(n=60; 78.9 %) M=1.21. SD=.410	(n=16; 21.1%)
Please list any other approaches you use different than the ones listed above:		

Section 4

Below is a list of **resources** typically used to help students develop their critical thinking. Please check **YES** or **NO** to indicate the ones you use in your classes.

Journal Articles	(n=72; 94.7%) M=1.05 SD=.225	(n=4; 5.3%)
Books	(n=55; 74.3%) M= 1.26 SD=.440	(n=19; 25.7%)
News Articles	(n=74; 98.7%) M= 1.01 SD=.115	(n=1; 1.3%)
Podcasts	(n=60; 81.1%) M=1.19 SD=.394	(n=14; 18.9%)
Documentaries	(n=64; 85.3%) M= 1.15 SD=.356	(n=11; 14.7%)
Videos	(n=72; 94.7%) M= 1.05 SD=.225	(n=4; 5.3%)
Real-life Examples	(n=74; 98.7%) M= 1.01 SD=.115	(n=1; 1.3 %)

Section 5

The following questions are designed to gain insights into your teaching practice related to developing thinking skills – specifically, **critical** thinking skills. Please answer the extent to which you agree with each statement. These items are used with permission from Dilekli & Tezci (2018).

18. I am able to find activities for my TOK classes that are related to teaching thinking skills. M=4.08 SD=.823				
Strongly disagree 1	Disagree 2 (n=6; 7.8%)	Neutral 3 (n=5; 6.5%)	Agree 4 (n=43; 55.8%)	Strongly agree 5 (n=23; 29.9%)
19. I can organize the TOK course to teach critical thinking skills. M=4.14 SD=.683				
Strongly disagree 1	Disagree 2 (n=1; 1.3%)	Neutral 3 (n=10; 13.0%)	Agree 4 (n=43; 55.8%)	Strongly agree 5 (n=23; 29.9%)
20. I can apply assessment techniques which make assessing thinking skills possible. M=3.92 SD= .855				
Strongly disagree 1	Disagree 2 (n=7; 9.1%)	Neutral 3 (n=10; 13.0%)	Agree 4 (n=42; 54.5%)	Strongly agree 5 (n=18; 23.4%)
21. I can prepare classroom activities for teaching thinking skills. M=4.04 SD=.785				

Strongly disagree 1	Disagree 2 (n=4; 5.2%)	Neutral 3 (n=10; 13.0%)	Agree 4 (n=42; 54.5%)	Strongly agree 5 (n=21; 27.3%)
22. I know how to improve thinking skills of the students who have difficulty in learning them. M=3.56 SD=.980				
Strongly disagree 1 (n=1; 1.3%)	Disagree 2 (n=11; 14.3%)	Neutral 3 (n=22; 28.6%)	Agree 4 (n=30; 39.0%)	Strongly agree 5 (n=13; 16.9%)
23. I am able to cope with the problems which may occur during the process of teaching thinking skills. M=3.90 SD=.882				
Strongly disagree 1 (n=1; 1.3%)	Disagree 2 (n=6; 7.8%)	Neutral 3 (n=10; 13.0%)	Agree 4 (n=43; 55.8%)	Strongly agree 5 (n=17; 22.1%)
24. I can design activities to improve self-learning abilities of students instead of teaching them. M=3.94 SD=.833				
Strongly disagree 1	Disagree 2 (n=6; 7.8%)	Neutral 3 (n=11; 14.3%)	Agree 4 (n=42; 54.5%)	Strongly agree 5 (n=18; 23.4%)
25. I cite real life situations (RLS) to teach thinking skills. M=4.42 SD=.593				
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

1	2	3 (n=4; 5.2%)	4 (n=37; 48.1%)	5 (n=36; 46.8%)
26. I know how to evaluate/assess improvement of students' thinking skills. M=3.90 SD=.788				
Strongly disagree 1	Disagree 2 (n=6; 7.8%)	Neutral 3 (n=10; 13.0%)	Agree 4 (n=47; 61.0%)	Strongly agree 5 (n=14; 18.2%)
27. I know how to motivate students to think critically. M=3.94 SD=.732				
Strongly disagree 1	Disagree 2 (n=4; 5.2%)	Neutral 3 (n=11; 14.3%)	Agree 4 (n=48; 62.3%)	Strongly agree 5 (n=14; 18.2%)
28. I know what components are required during improvement of students' thinking skills. M=3.64 SD=.842				
Strongly disagree 1	Disagree 2 (n=7; 9.1%)	Neutral 3 (n=25; 32.5%)	Agree 4 (n=34; 44.2%)	Strongly agree 5 (n=11; 14.3%)
29. I can arrange activities intended to improve higher order thinking skills. M=3.96 SD=.768				
Strongly disagree 1	Disagree 2 (n=4; 5.2%)	Neutral 3 (n=12; 15.6%)	Agree 4 (n=44; 57.1%)	Strongly agree 5 (n=17; 22.1%)

30. I know which activities improve critical thinking skills. M=3.84 SD=.796				
Strongly disagree 1	Disagree 2 (n=5; 6.5%)	Neutral 3 (n=16; 20.8%)	Agree 4 (n=42; 54.5%)	Strongly agree 5 (n=14; 18.2%)
31. I have adequate knowledge of thinking skills. M=3.88 SD=.903				
Strongly disagree 1	Disagree 2 (n=8; 10.4%)	Neutral 3 (n=12; 15.6%)	Agree 4 (n=38; 49.4%)	Strongly agree 5 (n=19; 24.7)
32. I feel competent to determine what thinking skills are. M=3.82 SD=.869				
Strongly disagree 1	Disagree 2 (n=8; 10.4%)	Neutral 3 (n=13; 16.9%)	Agree 4 (n=41; 53.2%)	Strongly agree 5 (n=15; 19.5%)
33. I have adequate experience on how to promote attainment of thinking skills given in TOK. M=3.79 SD=.894				
Strongly disagree 1	Disagree 2 (n=8; 10.4%)	Neutral 3 (n=16; 20.8%)	Agree 4 (n=37; 48.1%)	Strongly agree 5 (n=16; 20.8%)
34. I have adequate knowledge on how to promote attainment of thinking skills given in TOK. M=3.75 SD=.861				

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5
	(n=6; 7.8%)	(n=22; 28.6%)	(n=34; 44.2%)	(n=15; 19.5%)

