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STUDENT PERCEPTIONS OF SUCCESSFUL
PREPARATION FOR IBDP: IMPLICATIONS FOR
DEVELOPING 21ST CENTURY SKILLS

A DOCTORAL DISSERTATION

BY

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Öykü Dulun

May 2018

I certify that I have read this doctoral dissertation and have found that it is fully adequate, in scope and in quality, as a dissertation for the degree of Doctor of Philosophy in Curriculum and Instruction.

Asst. Prof. Dr. Jennie Farber Lane (Supervisor)

I certify that I have read this doctoral dissertation and have found that it is fully adequate, in scope and in quality, as a dissertation for the degree of Doctor of Philosophy in Curriculum and Instruction.

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ABSTRACT

STUDENT PERCEPTIONS OF SUCCESSFUL PREPARATION FOR IBDP: IMPLICATIONS FOR DEVELOPING 21ST CENTURY SKILLS

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Ph. D. in Curriculum and Instruction

Supervisor: Asst. Prof. Dr. Jennie Farber Lane

May 2018

This dissertation used comparative case study methodology to investigate student perceptions of how they were prepared for the International Baccalaureate Diploma Programme. The study focused on students in grades 9 and 10 from three different cases. One case involved students who were prepared through the Turkish national curriculum, a second through the International General Certificate of Secondary Education and the third with the International Baccalaureate Organisation's Middle Years Programme.

Questionnaires and focus group interviews were used to gain student insights about how each approach developed their learning strategies and affected their dispositions. Students were also asked about their critical thinking skills. Further understanding of students' critical thinking skills was learned by examining samples of their work. These particular attributes were investigated because of their relevance to 21st century skills that are needed for a sustainable future.

The study revealed that students from all three cases had positive perceptions of their learning experiences in grades 9 and 10. They especially credited their language classes with providing them opportunities to think independently and creatively. Students emphasized the importance of developing their communication skills in addition to critical thinking. Students from the national programme and the International General Certificate of Secondary Education indicated they felt more confident preparing for exams. The International Baccalaureate Organisation's Middle Years Programme provided students with more opportunities for research and to think independently. Implications for improving preparation for the International Baccalaureate Diploma Programme are provided based on students' insights. In addition to preparing students for a rigorous upper high school programme, developing 21st century skills, such as critical thinking and communication, will better ensure they will be able to contribute to a sustainable future.

Key words: critical thinking; 21st century skills, dispositions; International Baccalaureate Diploma Programme; international education; learning strategies; student perceptions

ÖZET

ÖĞRENCİLERİN BAKIŞ AÇISINDAN ULUSLARARASI BAKALORYA DİPLOMA PROGRAMINA HAZIRLIK SÜRECİ: 21. YÜZYIL BECERİLERİNİ GELİŞTİRMEK ÜZERİNE

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Bu tez, Uluslararası Bakalorya Diploma Programına hazırlanan öğrencilerin nasıl hazırlandıklarına ilişkin algılarını araştırmak için karşılaştırmalı vaka çalışması metodolojisini kullanmıştır. Çalışma, üç farklı vakadan 9 ve 10. sınıftaki öğrencilere odaklanmıştır. Bu vakalar: Türk Milli Eğitim müfredatıyla hazırlanan, Uluslararası Genel Ortaöğretim Sertifikası programıyla hazırlanan ve Uluslararası Bakalorya Organizasyonu'nun Orta Yıllar Programı ile hazırlanan öğrencilerden oluşmaktadır.

Öğrencilerin görüşleri hakkında bilgi toplamak için anketler ve odak grup görüşmeleri kullanılmıştır. Öğrencilere ayrıca eleştirel düşünme becerileri hakkında da sorular sorulmuştur. Öğrencilerin eleştirel düşünme becerileri hakkında daha fazla bilgi edinebilmek adına 10. sınıf sonunda tamamladıkları proje örnekleri incelenmiştir. Bu çalışmada söz konusu olan beceriler aynı zamanda sürdürülebilir bir gelecek için gerekli olan 21. yüzyıl becerileriyle örtüştüğü için araştırılmıştır.

Araştırma, her üç vakadan öğrencilerin 9 ve 10. sınıflardaki öğrenim deneyimleri hakkında olumlu algılarının olduğunu ortaya koymuştur. Özellikle dil derslerinin, bağımsız ve yaratıcı düşünebilme fırsatları sunduğu öğrenilmiştir. Öğrenciler eleştirel düşünmenin yanı sıra iletişim becerilerini geliştirmenin önemini vurgulamışlardır. Türk Milli Eğitim müfredatı ve Uluslararası Genel Ortaöğretim Sertifikası'ndaki öğrenciler, sınavlara hazırlanma konusunda daha hazır hissettiklerini belirtmişlerdir. Uluslararası Bakalorya Organizasyonu'nun Orta Yıllar Programının, öğrencilere daha fazla araştırma fırsatı ve bağımsız düşünme fırsatı tanımakta olduğu öğrenilmiştir. Bu çalışma sayesinde öğrencilerin bakış açılarına dayanarak, Uluslararası Bakalorya Diploma Programı için hazırlık aşamalarının geliştirilmesine yönelik etkili eğitim ve öğretim stratejileri tartışılmıştır. Öğrencileri Uluslararası Bakalorya Diploma Programına hazırlamanın yanı sıra eleştirel düşünme ve iletişim becerileri gibi 21. yüzyıl becerilerini geliştirmek, sürdürülebilir bir geleceğe katkıda bulunmalarını daha iyi sağlayacağı sonucuna varılmıştır.

Anahtar kelimeler: eleştirel düşünme; 21. Yüzyıl becerileri; eğilimler; Uluslararası Bakalorya Diploma Programı; uluslararası eğitim; öğrenme stratejileri; öğrencilerin algıları

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION.....	1
Background.....	4
International Baccalaureate Diploma Programme (IBDP) and 21 st century skills.....	6
Preparation for the IBDP	8
Ministry of National Education	9
IBDP preparation offered through the Ministry of National Education Programme (MoNEP)	10
International Baccalaureate Organisation.....	11
IBDP preparation offered by the IBO: the IB Middle Years Programme (IBMYP).....	12
Cambridge International Examinations (CIE).....	13
IBDP preparation through CIE: The International General Certificate of Secondary Education (IGCSE).....	14
Problem.....	14
Purpose	15
Research questions	16
Significance	16
Definition of terms	17
Summary.....	19
CHAPTER 2: LITERATURE REVIEW.....	21
Education for sustainable development.....	21
Importance of an international education and International Mindedness in supporting 21 st century skills.....	23
Turkish curriculum and 21 st century skills	26
Findings of studies investigating IBMYP and IGCSE	29
Theoretical framework for the study	33
Learning strategies needed by early adolescents.....	34
Dispositions needed by adolescents	35
Summary.....	36
CHAPTER 3: METHODOLOGY	36
Research design	37
Research context: Case criteria and selection.....	38
Comparability of the cases	41
Collection of academic scores for IBDP Scores.....	42
Collection of academic scores for Case IGCSE.....	42

Collection of academic scores for Case IBMYP and Case MoNEP	42
Collection of academic scores for IBDP Scores.....	43
Stages of the research study.....	44
Quantitative stage (for research questions 2 and 3).....	46
Participants in the quantitative stage	46
Instrumentation for the quantitative stage	48
Data collection during the quantitative stage	51
Construct validity and the reliability	51
Data analysis for the quantitative stage	54
Qualitative stage (for research questions 2, 3, and 4).....	54
Participants in the qualitative stage (focus group interviews).....	55
Instrumentation for the qualitative stage (focus groups).....	56
Data collection for the qualitative stage (focus groups).....	57
Data analysis for qualitative stage (focus groups).....	58
Document analysis of student projects for the qualitative phase (research question 4).....	59
Summary.....	61
CHAPTER 4: RESULTS	62
Introduction	63
Results for research question 1: Contributions to 21 st century skills	64
Quantitative results for research question 2: Learning strategies.....	69
Descriptive statistics	70
Qualitative results for research question 2: Learning strategies.....	72
Quantitative results for research question 3: Dispositions	74
Descriptive statistics	74
Qualitative results for research question 3: Dispositions	77
Results for research question 4: Critical thinking skills.....	83
Student perceptions of IGCSE contributions to the development of their critical thinking skills.....	84
Student perceptions of MoNEP contributions to the development of their critical thinking skills.....	87
Student perceptions of IBMYP contributions to the development of their critical thinking skills.....	89
Indications of students' critical thinking skills exhibited in their major projects	94
Additional insights into pre-IBDP preparation from all three cases	95
Case IBMYP insights	95
Case IGCSE insights	96
Case MoNEP insights.....	97
Conclusion.....	98
CHAPTER 5: DISCUSSION	99

Introduction	99
Overview of the study	99
Overall findings and considerations	101
Findings for the research questions	107
Finding 1	107
Finding 2	110
Finding 3	112
Finding 4	113
Implications for practice	114
Suggestions for further research	117
Limitations	119
Conclusion	120
REFERENCES	121
Appendix A: Student survey	138
Appendix B: General focus group interview questions for grade 10, 11 and 12 students	143
Appendix C: The holistic critical thinking scoring rubric – HCTSR	144
VITA	145

LIST OF TABLES

Table		Page
1	The relationship between the attributes measured in this study with ATL, 21 st century skills and the sustainability literacy attributes by the analyses	26
2	Number of private IB world schools and the offered programmes in Turkey	39
3	Number of Cambridge schools and the offered programmes in Turkey	39
4	Case school selection criteria (√=yes; - = no)	40
5	Research questions for the study and their analysis	45
6	Number of students who participated in the first part of quantitative study (student questionnaire)	46
7	Information about Case IBMYP student participants' grade level and gender distribution in the quantitative stage	47
8	Information about Case IBMYP student participants' parents' level of education	47
9	Information about Case IGCSE student participants' grade level and gender distribution in the quantitative stage	47
10	Information about Case IGCSE student participants' parents' level of education	47
11	Information about Case MoNEP student participants' grade level and gender distribution in the quantitative stage	48
12	Information about Case MoNEP student participants' parents' level of education	48
13	Details of original instruments for the questionnaire	49
14	Item-total statistics for self-regulation questionnaire	52
15	Item-total statistics for metacognition questionnaire	52
16	Item-total statistics for motivation questionnaire	53
17	Item-total statistics for attitudes questionnaire	53
18	Number of students who participated in the qualitative study (focus groups)	56
19	Main themes of the interview questions	57
20	Description of student projects	60
21	Descriptive statistics of students' perceptions on how the programmes had impact on their self-regulation	70
22	Descriptive statistics of students' perceptions on how the programmes had impact on their metacognitive skills	71
23	Descriptive statistics of students' perceptions on how the programmes motivate them	74
24	Descriptive statistics of students' perceptions on how the programmes had impacted on their attitudes	76
25	List of course materials that motivate students to learn	82
26	Rater's score table on students' projects	95
27	Summary of the key findings	104

LIST OF FIGURES

Figure	Page
1 Research framework	34

CHAPTER 1: INTRODUCTION

*It was the best of times, it was the worst of times, it was the age of wisdom,
it was the age of foolishness...*
Charles Dickens, 1859

When Charles Dickens wrote the famous introductory paragraph for a *Tale of Two Cities*, he was reflecting on the past. When envisioning the future for today's high school students, this sentence can be revised to foresee forthcoming possibilities: "It will be the age of raging war, it will be the age of long-lasting peace, it will be the time of darkest failures, it will be the time of brightest successes, everything will be before us, nothing will be left for us..." If people from Charles Dickens' time could see the many technological advances of today's world, they might think that the young people had everything before them; but the young people of the 21st century also have many challenges. Children today face uncertainties regarding climate change, global resource depletion, nuclear war, and many other concerning issues. They need to make thoughtful and wise choices to resolve these and other conflicts awaiting them. It is important, however, that they recognise and understand that these environmental issues are "wicked problems"; they are complex societal issues that have multiple causes and no easy solution (Balint et al., 2011; Caron et al., 2009; Dillon, et al., 2016; Rittel et al., 1973). These problems have emerged from conflicts over the consumption and management of natural resources and they result from the prioritisation of short-term economic gains over long-term conservation goals. To resolve these issues will require ways of thinking that are more advanced and

systemic than earlier approaches. Furthermore, if and when these “wicked problems” are resolved, the positive outcomes of these decisions and responsible actions can be sustained only if young people have the skills and dispositions to provide consistent and ongoing support. Various educators, researchers, and futurists have discussed what these skills and dispositions need to be. For the current study, they are described as 21st century skills for a sustainable future.

The questions for the current research relate to what children need to learn to contribute positively to their future. This need is a global one as outlined by the United Nations Educational Scientific and Cultural Organisation (UNESCO) (UNESCO, 2017a). They explain the importance of developing students’ work and life skills by encouraging life-long learning. The thinking skills they endorse relate to those young people need to understand global and “wicked problems” of this century.

Although the outcomes of this study concern global issues, the impetus started from a local concern. It arose from personal experiences of the researcher, who is a high school International Baccalaureate Diploma Programme (IBDP) biology teacher. She observed that although her students successfully passed rigorous programmes in grades 9 and 10, they often lacked some of the skills required for success in the IBDP. For example, they focused on memorisation to prepare for exams, rather than aiming to develop higher level thinking skills. Furthermore, she became aware that students were not motivated to advance and monitor their own learning. In particular, she noticed their time management skills, internal motivation and more importantly, their learning strategies were insufficient. They seemed lost when introduced to the requirements of the Extended Essay (an independent research study where students

are responsible for trying to find a solution to a problem related to one of the IBDP subject areas). She was concerned because it was apparent that her students were not independent learners, they lacked the confidence to acquire new knowledge without the guidance of a teacher.

As a result of these concerns, she asked herself the question: “What is an IBDP education for?” She knows that, in general, students pursue an education through the IBDP to prepare for university learning. Therefore, she decided to conduct a study to investigate how students in grades 9 and 10 were being prepared for the IBDP. She was counselled to consider, however, that the IBDP also provides students with skills they will need to contribute to a sustainable future for themselves and following generations. Through this investigation, she came to understand how learning through the IBDP, and other globally minded programmes can help students ensure that their future will be “the best of times.”

The following background provides information about the IBDP and introduces how the goals of the programme relate to 21st century skills. Then, the ways of preparing grades 9 and 10 students in Turkey for such a challenging programme are introduced. The background leads to the problem of the study, followed by the purpose and research questions. The importance of providing students with the 21st century skills they will need to support a sustainable future are revisited in the significance of this study, followed by key terms used in this dissertation.

Background

This research investigated how students from three different learning experiences in grades 9 and 10 prepared them for a challenging high school education programme: the International Baccalaureate Diploma Programme (IBDP). The three programmes are the International Baccalaureate Middle Years Programme (IBMYP); the International General Certificate of Secondary Education (IGCSE); and the Turkish Ministry of National Education Programme (MoNEP). Regarding preparation, this study focused on perceptions related to learning strategies, dispositions, and critical thinking skills.

The IBDP is a programme of the International Baccalaureate Organisation (IBO), which features international education and fosters international mindedness.

International education was defined by Thompson (1998) as having core features such as a curriculum which promotes international mindedness. Gellar (2002) added to this definition by stating two distinguishable characteristics of international schools as having international curriculum and a set of ethical universal values.

International mindedness involves having an intercultural understandings and respect for differences among the thoughts, beliefs and values of people around the world (Tate, 2013). Among the knowledge and skills the young people will need to succeed in a globalised world, is the appreciation and understanding of other cultures.

International education programmes support international mindedness to promote global citizenship (Cambridge, 2012).

The IBO has programmes for all grades, including one for the last two years of high school (upper high school), which is the IBDP. It is an interdisciplinary programme that emphasizes the process of learning (rather than the product) while promoting scaffolding strategies in accordance with humanist and essentialist philosophies (Ateşkan, Onur, Sagun, Sands, & Corlu, 2014).

Several studies have highlighted the positive outcomes of students who have received an education through the IBDP (Bagnal, 2010; Bunnell, 2008; Hill, 2012). Suldo, Shaunessy, and Hardesty (2008) noted that the IBDP is a challenging and demanding programme that has enormous benefits. Their study found that IBDP students were more academically successful compared to their peers who were studying within a national curriculum. In Turkey, Ateşkan et al. (2014) reported that compared to students who only experienced the Turkish national curriculum, students who received an IBDP certificate completed their university education in a timelier manner, expressed a positive and practical understanding of critical thinking skills, and have a three times higher graduation rate from university than non-IBDP students. Some private and foundational universities within Turkey also provide successful IBDP graduates with full or partial scholarships. The Turkish Ministry of National Education (MoNE) has approved three government schools to implement the IBDP in 2007 and 2016 (International Baccalaureate Organisation [IBO], 2017a). Ateşkan et al. (2014) note that this is evidence that the government recognises the merit of advanced education programmes for preparing students for university.

However, the successes of the IBDP for students do not come without costs. The heavy workload and academic expectations cause students to have a higher stress

levels (Foust, Hertberg-Davis, & Callahan, 2009). Suldo et al., (2008) examined the relationships among stress, coping, and mental health of high-achieving high school students. They learned that students in the IBDP reported having high levels of stress because they needed to prepare for exams, achieve good grades, complete homework and manage their time. To prepare for a challenging programme as the IBDP, which takes place in grades 11 and 12, there are schools that implement enhanced curricula at the lower secondary school level (grades 9 and 10). Following is further information about the IBDP and the preparatory programmes in Turkey.

International Baccalaureate Diploma Programme (IBDP) and 21st century skills

There are 3,104 schools in 147 countries that follow the IBDP: a dynamic, two-year student-centred programme. Through scaffolding student learning, the programme emphasizes the process of learning rather than the product. Furthermore, the interdisciplinary approach is evident in each subject area within the IBDP curriculum.

The IBDP aims to raise knowledgeable, inquiring, caring and compassionate students. It promotes intercultural understanding, open-mindedness and the attitudes required to respect and evaluate different perspectives (IBO, 2017b). The programme strives to enhance students' educational backgrounds by providing them with the opportunities to apply their knowledge and skills in three core elements: Theory of Knowledge (TOK), Extended Essay (EE) and Creativity, Activity and Service (CAS).

The first core element, TOK, is offered as a course in which students think in-depth and reflect on the nature of knowledge, as well as question how we know what we claim to know. Students must complete the second element, the Extended Essay (EE), within at least one course in which they are registered. EE is basically an independent research where a student produces a 4,000-word research essay following relevant assessment criteria. For the third core element, students are required to complete projects related to “Creativity,” “Activity,” and “Service,” (CAS). All three core elements of the IBDP promote global citizenship by enhancing students’ critical and creative thinking skills. Moreover, they aim to help students adopt a sense of respect for other cultures, support each other and be open-minded (IBO, 2017c). Beard and Hill (2008) describe the IBO as an answer for globalization since it promotes a global perspective by:

- Insisting that all students study at least one second language.
- Drawing on examples from different countries.
- Urging students to consider multiple perspectives.
- Developing an appreciation of other cultures and religions.
- Addressing global issues and providing possible solutions.
- Encouraging student and faculty exchanges with other countries.

When Beard and Hill were describing the IBO as a promoter for a global perspective, they considered the essential skills for the 21st century that were listed within the reports released by the American National Centre on Education and the Economy (2006) and the Association of American Colleges and Universities (2007). The skills they identified (skills that are in alignment with the IB learner profile) are as follows:

- Creativity and innovation
- Self-discipline and organisation
- Leadership
- Teamwork
- Cross-disciplinary knowledge
- Communication skills

- Analytical reasoning
- Real-world problem-solving skills

When the ten attributes of the IB learner profile are examined, it is observed that these attributes have a clear connection with 21st century skills as well.

IB learners are defined as knowledgeable and thinkers to the extent to which they demonstrate their creativity and innovation skills through possessing cross-disciplinary knowledge. With their knowledge across a range of areas, they concern themselves with issues and ideas of both local and global significance. Their critical thinking skills also help them take responsible action on real-world problems, and ethical decisions etc. The IB learners develop teamwork and communication skills, as they are defined to be inquirers and communicators. They do not only learn how to learn independently but also with others as well. They learn how to collaborate and communicate effectively with others, thus developing an understanding and respect for other individuals. Above all, the IB learner profile attributes together provide the learners with the environment to develop leadership skills.

Preparation for the IBDP

In Turkey, there are three different approaches that schools use to prepare students for the IBDP. Firstly, all schools in Turkey are required to follow the national curriculum developed by the Ministry of National Education (MoNE). National schools that offer the IBDP in addition to the national programme will provide students with enrichment activities in grades 9 and 10 to prepare them for the international programmes. Secondly, some schools have opted to enhance their lower

high school programmes (i.e., grades 9 and 10) by implementing the International General Certificate of Secondary Education (IGCSE) offered by the Cambridge Assessment International Examinations (CAIE); it is known as the world's largest international qualification for 14-16 years old students in 6,100 schools in more than 145 countries (CAIE, 2018a). Currently, there are about 17 schools delivering the IGCSE curriculum in Turkey. There are five schools in Turkey offering both the IGCSE curriculum and the IBDP. There are 11 schools implementing another IB programme called the IB Middle Years Programme (IBMYP) which is designed for grades 6 through 10. These three preparatory programmes implemented by the MoNE, IBO and the CIE are at the focus of the current investigation and are described below.

Ministry of National Education

MoNE is the controlling body in Turkey that decides whether and how to establish a school and it ensures that schools conform to the national education norms and standards. The MoNE functions according to the common and specific aims and general principles of the Turkish National Education System. The MoNE provides schools with a Ministry of National Education Programme (MoNEP) curriculum at three levels: four years at primary school, four years at middle school, and four years at high school. The national programme recently adopted a student-centred approach to education, using active learning strategies enhanced with an understanding of the democratic institutional culture to improve students' knowledge, skills, and values (MEB, 2018).

IBDP preparation offered through the Ministry of National Education Programme (MoNEP)

MoNEP consists of a 12-year compulsory education including primary school (grade 1 to 4), middle school (grade 5 to 8), and high school (grade 9 to 12). Students who complete primary education continue to middle school without any examination. In middle school students are offered a more flexible education according to their skills and needs. MoNEP offer elective courses in six areas: Language and Expression, Foreign Languages (English), Science and Mathematics, Arts and Sports, Social Sciences, Religion, Morality and Values. Students take 36-37 class hours per week, 8 of which are elective courses.

Following middle school, students take a standardized exam to continue secondary education in high schools that offer academically strong and good quality education. Students have 35 class hours per week in general high schools; whereas in the schools which are accredited by IBO and IGCSE they have 34-45 class hours in grade 9 and 40-45 hours from grade 10 onwards. MoNEP allows these schools to teach all the lessons in English except for Turkish language and literature, and history. These schools are also allowed to implement their own elective biology, physics and chemistry lessons in high school prep year, grades 9 and 10. In prep year the curriculum offers: Turkish, first and secondary language, physical education, elective language and expression, mathematics and science courses, elective arts, elective information and communication technology courses. The prep year is required in these schools to ensure that the students have the necessary abilities in speaking, writing, and reading in the English language to study in an international programme. In grades 9 and 10 the curriculum offers the same courses as the other general high schools.

Through a student's schooling, including their lower secondary school years, the MoNE curriculum aims to develop students' physical abilities, cognitive skills, moral values, social skills, and cultural understandings. The MoNE's other purpose is to build healthy, balanced and dynamic relationships between education and employment by fostering respect for human rights and democracy in preparation for the students' future. With this focus, students are also encouraged to improve their self-confidence, self-control and sense of responsibility as life-long learners while they are adopting a positive work habit and solidarity. Equally important, MoNE develops students' creative and critical thinking skills along with teaching them a foreign language so that they can follow global developments. To perform their improved skills students are also expected to enhance their educational experience by completing a project which is created using their own knowledge and skills (MEB, 2014).

International Baccalaureate Organisation

The International Baccalaureate Organisation (IBO), a non-profit organisation established in 1968, offers high quality programmes for primary, middle, and secondary education. Their curricular programmes develop students' intellectual, social, emotional and physical well-being. The programme for the last two years of high school, the IB Diploma Programme (IBDP), is a very rigorous and challenging programme for both teachers and students (IBO, 2018b).

In order to prepare students for the challenges of the IBDP, and for the future, IBO has implemented preparation programmes for primary, middle school and lower high school students. Some IBO world schools in Turkey offer IB's Middle Years

Programme through grade 6 to 10. The details of the IBMYP and its implementation in Turkey are provided below.

IBDP preparation offered by the IBO: The IB Middle Years Programme (IBMYP)

There are 1,356 schools in 108 countries which follow the IBMYP. In Turkey, the IBMYP is offered in eleven private schools, seven of which are in Istanbul, the others are in Bursa, Edirne and Ankara (IBO, 2017a). The IBMYP is flexible, so Turkish national curriculum requirements are met at the same time as following the IBMYP.

In general, the IBMYP has the goal of developing students' personal understanding and sense of self and responsibility in their community. IBMYP has six underpinning concepts that they follow in order to achieve this goal:

- *Teaching and Learning in Context*; in which student experiences and lives are connected to their learning experiences in a common context.
- *Global Contexts*; where “identities and relationships,” “personal and cultural identity,” “orientations in space and time,” “scientific and technical innovation,” “fairness and development” and “globalization and sustainability” help the student develop an understanding of common humanity and a shared guardianship of their planet.
- *Conceptual Understanding*; where students use concepts as a vehicle to inquire into locally and globally significant issues and ideas and to examine their knowledge in a holistic way.
- *Approaches to Learning*; which is a foundation for independent learning to encourage the students to apply their knowledge and skills to unfamiliar contexts. The aim is to develop and apply social, thinking, research,

communication and self-management skills that will help the students to learn how to learn.

- *Service as Action*; through community service which is very similar to CAS in the IBDP. Furthermore, students must complete a long-term project, similar to EE in the IBDP, where they develop a proposal and implement an action project on a topic about which they would like to learn more. The aim is for students to apply what they are learning in the classroom and beyond and in doing so to be educated as caring members of their communities as they make a difference to the lives of others and to their environment.
- *Inclusion and Learning Diversity*; is where schools must have differentiation among the written, taught and assessed curriculum for varying learning needs which is provided in their unit planner and in teaching environment.

Cambridge International Examinations (CIE)

Formerly known as Local Examinations Syndicate, the non-profit organisation Cambridge Assessment International Examinations (CAIE) has a 150 year history that aims to raise standards in education. The name was changed to CAIE in 2005. CAIE is currently the largest international education provider for 5-19 years old, serving more than 10,000 schools in more than 160 countries (CAIE, 2018a).

Cambridge International General Certificate of Secondary Education (IGCSE) is the world's largest international qualification for 14-16 years old students in 5,500 schools in more than 140 countries.

IBDP preparation through CIE: The International General Certificate of Secondary Education (IGCSE)

The Cambridge IGCSE syllabi are considered as “excellent” programmes for secondary school students aged between 14-16 years to prepare for other higher Cambridge programmes and for the IBDP (CAIE, 2018b). However, the IGCSE is not officially an IBDP preparation programme. The curriculum itself has an international outlook but is suitable for local (national) programmes. It provides opportunities for local learning and the content is flexible enough for schools around the world to adapt it to their situation. Furthermore, it has been designed to avoid cultural bias. It also develops essential lifelong skills, including critical thinking and problem solving (CAIE, 2015). The aim of the Cambridge IGCSE syllabi can be summarized as to:

Balance knowledge, understanding and skills to enable candidates to become effective learners and to provide a solid foundation for their continuing educational journey (CIE, 2018b).

Problem

Given the benefits of the IBDP along with the challenges, there have been discussions on how best to prepare students to be successful in the IBDP (Australian Council for Educational Research [ACER], 2015; Ateşkan et al., 2014; Bagnall, 2010). As discussed previously, the IBDP is more than just a programme to prepare students for university entrance; students are provided with skills to contribute to a sustainable future through the IBDP education but the literature is limited in this aspect. Expectations for students are set at a very high level from the moment they start the programme, since graduating from such a prestigious programme requires a great effort for adolescents. IB students are claimed to demonstrate self-discipline and organisation as they are defined as principled, thus acting responsibly. As they

influence their environment by engaging with their self-discipline, observing self-regulation and metacognition processes are also possible. However there needs to be a collection of more valid data to see if these attributes are developed in their preparation for the IBDP.

In fact, very few studies have examined the compatibility of IGCSE and IBMYP (e.g., Guy, 2001). In some studies, the compatibility of both programmes on particular subject areas, such as mathematics and sciences, were compared (Corlu, 2014; Reimers, 2004; Sagun, 2014). These studies revealed interesting and sometimes conflicting findings regarding the merits of each programme. However, there have been no studies to date that compare these programmes to the Turkish national curriculum in terms of the IBDP preparation.

This gap in the literature leads to a need for further insights into how these pre-IBDP programmes and others can prepare students for advanced learning during their upper high school years. It is important to learn how these three programmes prepare students for the IBDP and how to be global citizens for a sustainable future.

Purpose

The purpose of this study is to investigate students' perceptions of the three programmes – the MoNEP, IBMYP and IGCSE – in preparation for the IBDP. Students' learning strategies (metacognition and self-regulation) and dispositions (motivation and attitudes towards learning) will be investigated in each programme. Furthermore, the study will examine how students from each programme exhibit critical thinking (a 21st century skill). Since most students in Turkey who enrol in the

IBDP come from MoNE schools (rather than IBMYP or IGCSE schools), the primary intention of this study will be to provide the Turkish Ministry of Education with practical recommendations for opportunities to develop teaching and learning strategies to enhance high school education in Turkey for a sustainable future.

Research questions

The research questions for this study are listed as follows:

Research question 1: Which aspects of the IBDP preparation support selected learning strategies and dispositions needed for the development of students' 21st century skills?

Research question 2: How do students perceive that MoNEP, IGCSE, and IBMYP help develop their learning strategies, in particular metacognitive skills and self-regulated learning, in preparation for IBDP?

Research question 3: How do students perceive that MoNEP, IGCSE, and IBMYP influence their dispositions, in particular attitudes and motivation, in preparation for IBDP?

Research question 4: How do students from MoNEP, IGCSE, and IBMYP compare in how they exhibit aspects of critical thinking skills?

Significance

With the increasing number of IB world schools in Turkey, the government has started to appreciate how an international education can work with, and further

develop, the national curricula. By developing particular attributes (which is called the Learner Profile) the IBO aims to develop internationally-minded individuals who will recognize the common humanity and shared ownership of the planet Earth to help create a better and peaceful world. The learner profile, which aligns with the 21st century skills, includes the following attributes: inquirer, knowledgeable, thinker, communicator, principled, open-minded, caring, risk-taker, balanced and reflective. As a programme that also helps students to face the future, the IBDP aims to raise global citizens who can think for themselves, think globally and act locally, care for and respect others and who can think critically.

One evidence of the Turkish government's appreciation of the IBDP, is that MoNE now offer mathematics courses with two options: standard level and high level, according to students' interests and achievement level (MEB, 2018). In addition, the Turkish curriculum has increased strategies to promote internationally-minded global citizens, which according to IBO (2017c) is one of their foundation principles.

Rather than comparing schools to determine if one programme is better than another, this study provides schools and curriculum planners with an opportunity to understand the student perspective of their learning experiences in grades 9 and 10. These student insights help identify strategies and practices that all three programmes can use to better prepare students for the future by developing their 21st century skills.

Definition of terms

Approaches to learning (ATL): Strategies, skills and attitudes which inform the IB teaching and learning environment (IBO, 2015).

Critical thinking: A purposeful judgment resulting in interpretation, analysis, and evaluation as well as explanation of the basis for judgment (Facione, 1990).

Dispositions: Voluntary habits of acting and thinking (Katz, 1993).

International Baccalaureate Diploma Programme (IBDP): International curriculum for students aged between 16 and 18 years (IBO, 2018a).

International Baccalaureate Middle Years Programme (IBMYP): International curriculum for students aged between 11 and 16 years (IBO, 2018b).

International Baccalaureate Primary Years Programme (IBPYP): International curriculum for students aged between 3 and 12 years (IBO, 2018c).

International General Certificate of Secondary Education (IGCSE): International certificate programme which is designed for students aged between 14 and 16 years (CAIE, 2015).

Learning strategies: The approach to a task is considered as the learning strategy. This also includes the ways of thinking and acting of the learner when planning or performing a task and its outcomes (Schumaker & Deschler, 2006).

Metacognition: The stored knowledge or beliefs of a person about himself and others, about the tasks and actions he does and about the interaction of all of these to affect the consequences of an intellectual enterprise (Flavell, 1979).

Ministry of National Education Programme (MoNEP): Turkish National curriculum which is designed for students aged between 14 and 18 years old (MEB, 2014).

Motivational belief: The opinions of efficiency or effectiveness of an individual's own learning, judgments of effectiveness of teaching methods, and values about objects, events and subject-matter domains (Boekaerts, 2002).

Self-regulated learning: Students' metacognitively, motivationally, and behaviourally active participation in their own learning processes (Zimmerman, 1986).

Summary

This chapter introduced international education, focusing on the IBDP. The literature review in Chapter 2 will help to further investigate how the IBDP is related to the 21st century and how this can help prepare students for a sustainable future.

Research indicates that the IBDP graduates do better in their higher education studies compared to national curriculum graduates in Turkey. However, there is a gap in the literature on how to prepare the students for such a rigorous and challenging programme as the IBDP. This chapter introduced ways of preparing students the IBDP in Turkey.

Considering the case in Turkey, two other international programmes (IBMYP and IGCSE) that have been used by schools to prepare Turkish students for the IBDP, were also introduced. As an IBO programme, the IBMYP is aligned with the goals of the IB and the IBO considers it one of the best ways to prepare students for the requirements of the IBDP. The IGCSE is another prestigious international

programme with a similar summative exam to the IBDP at the end of two years. All Turkish students whether they are enrolled in an international programme or not, must also follow the national curriculum. Some schools that have an IBDP in grades 11 and 12 opt not to implement an international programme in lower high school, instead they provide students with advanced coursework to prepare them for the IBDP. The current investigation looked at all three approaches to IBDP preparation from the student perspective.

CHAPTER 2: LITERATURE REVIEW

The literature review presents other research studies that have investigated programmes that develop students' learning strategies and dispositions in support of their critical thinking and other 21st century skills. To learn more about these skills that will help students contribute to a sustainable future, the review begins with an overview of education for sustainable development. Next is a discussion of how the current Turkish national curriculum does and does not support advanced thinking skills and dispositions. The review continues by exploring how the IBDP, which is one of the most widely offered international programmes, promotes international mindedness that leverage students' 21st century skills. The current study is focused on learning how different programmes prepare students for the IBDP. Therefore, information about other studies that have investigated two international programmes that take place prior to IBDP, IGCSE and IBDP, are discussed. The learning strategies and dispositions that support critical thinking skills are discussed in this review to help form the theoretical framework for the current study, which is discussed at the end of the chapter. These attributes were initially chosen because of their support for academic success in the IBDP. As discussed in the previous chapter, these strategies, dispositions, and skills are also important for students beyond their academic career and can help them contribute to a sustainable future.

Education for sustainable development

Sustainable development as a concept was introduced in the late 1980s by the World Commission on Environment and Development (WCED). To further develop and

implement sustainable development, the United Nations (UN, 2018) had several subsequent meetings:

United Nations Conference on Environment and Development (1987)
General Assembly Special Session on the environment (1997)
World Summit on Sustainable Development (2002)
UN Conference on Sustainable Development (2012)
UN Sustainable Development Summit (2015)

When the concept of sustainable development was promoted, the WCED (1987) defined it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” However, UNESCO suggests seeing sustainable development as a “process of change” that requires global cooperation (UNESCO, 2001). With this definition and its amendment in mind, education is considered as a key for this change by providing public awareness of and skill development for a sustainable future. A growing body of research argues that rather than content knowledge, skills and dispositions have become particularly important for the 21st century (Gardner, 1999). These relevant skills include both cognitive and non-cognitive skills. Among the cognitive skills, Payne and Kyllonen (2012) include creativity, critical thinking skills and problem-solving skills. They identify non-cognitive skills as interpersonal (communication, cultural sensitivity, leadership and teamwork) and intrapersonal skills (persistence, self-efficacy, time management and work ethic). This education is more than developing knowledge, dispositions, and skills related to preserving environmental quality, it addresses issues related to human rights, poverty, gender inequality, population growth and so on. The UN emphasized the importance of education for a sustainable future by declaring 2005-2014 the Decade of Education for Sustainable Development (DESD).

During this decade, several researchers identified what is involved in effective education for sustainable development (de Haan, 2010; Rickmann, 2012; Wiek et al., 2011) and in UNESCO (2017b) presented a list of expected outcomes in their “Education for Sustainable Development Goal”. Among these, the current study is investigating non-cognitive skills (learning strategies and dispositions) and the cognitive skill of critical thinking.

Importance of an international education and International Mindedness in supporting 21st century skills

International education has been defined by Thompson (1998) as having core features such as a curriculum that promotes international mindedness. Gellar (2002) added to this definition by stating that international schools are distinguished by having an international curriculum and a set of universal ethical values. According to Cambridge (2012), international education is not the same as an international school. The key attributes of an international education include the following outcomes: global citizenship, intercultural understanding and respect for differences (Tate, 2013). International education offers student-centred, experiential educational philosophy and celebrates diversity and encourages international mindedness (Cambridge & Thompson, 2004).

Schools also have their own statements of international education in which they define their beliefs for the world of the future. They set criteria for their students to succeed in a highly globalizing world and they believe that students must develop such dispositions, attitudes and habit of mind. Many educational programmes, which focus on global competencies for life in the 21st century, aims for adolescents

developing ways to improve their critical thinking and judgement skills. Youth of the 21st century need to appreciate and understand other cultures and respect for differences. To achieve this international awareness or international mindedness, 21st century skills must be at the focus of our educational goals.

These educational goals, philosophies and ideologies are generally set in the mission and vision statements of the international bodies offering international education opportunity to schools. The International Baccalaureate's mission statement also emphasizes that they encourage students to become "active, compassionate and lifelong learners" (IBO, 2017b). For the IBDP, their aim is to improve students by helping them develop the following ten IB learner profile attributes: students are inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced and reflective. The IBO holds a strong belief that these ten attributes can help individuals and groups to take responsibility in their local, national and global communities (IBO, 2018d).

Given that becoming internationally minded involves lifelong learning, it follows that an international education has implications for a sustainable future. Kamalaldin, Michel and Sweet (2016) confirmed this when they analysed the IB learner profile and subject guides for the IBDP and found strong overlapping the programme and goals for sustainable development. Many of these goals include 21st century skills. According to the Partnership for 21st Century Learning (P21 [2018]), essential 21st century skills include collaboration and teamwork, creativity and imagination, problem solving, and critical thinking. These skills are similar to those found in IBO's Approaches to Learning (ATL). These ATL skills are grouped into five

closely linked, overlapped and interrelated categories: thinking skills, communication skills, social skills, self-management skills, and research skills to improve the quality of teaching and learning in IB programmes (IBO, 2015). Kaplan (1998) stated that IBDP students can become self-regulated learners by developing their ATL skills and the attributes of the IB learner profile. Furthermore, Wright and Lee (2014) argue that the 21st century skills are featured in the core curricular components of the IB: Theory of Knowledge (TOK), Extended Essay (EE), and Creativity, Action, Service (CAS). Hill (2006) and Hayden and Wong (1997) argue that students develop critical thinking skills through the TOK course as well as international mindedness. Participants in the study also added that the debates students hold in the Theory of Knowledge course also help them develop cognitive skills, such as critical thinking and self-reflection, which are highly relevant to the 21st century. The IB claims that the Extended Essay involves students in research and writing that engages their cognitive skills and improves creative thinking skills (IBO, 2018e). Wright and Lee (2014) report that CAS increases students' social skills and interpersonal non-cognitive skills.

Consequently, there is evidence in the literature that goals of the IBDP are comparable 21st century skills and education for a sustainable future. A summary of the some of the key similarities are highlighted in Table 1. The attributes highlighted are those investigated in the current study.

Table 1

The relationship between the attributes measured in this study with ATL, 21st century skills and the sustainability literacy attributes by the analyses

Attributes investigated in the current study	Sources and their skills			
	IBO learner profile attributes	Approaches to learning	21st century	Sustainability literacy
Self-regulation and metacognitive skills	Principled, balanced, reflective	Self-management skills	Self-management skills	Communicate effectively
Attitudes and motivation towards learning	Inquirer	Thinking skills	Self-directed learners	Capacity to use inquiring and knowing processes
Critical thinking skills	Thinkers	Thinking skills	Critical thinking skills	Think critically about value issues

Turkish curriculum and 21st century skills

A number of studies have identified and highlighted the challenges and shortcomings of the outcomes of the Turkish national curriculum. In 2006, Programme for International Student Assessment (PISA) results (which analyse students' thoughts, reasoning and the way they use what they learned at school and how they communicate) showed is below the international average. The more recent administration of PISA found similar results, meaning Turkey's performance has remained relatively unchanged over the past ten years (OECD, 2018).

According to Sarier's (2010) findings based on the results of the PISA, Middle School Placement Test (*Orta öğretim Kurumları Seçme ve Yerleştirme Sınavı*

[OKS]) and Placement Test (*Seviye Belirleme Sınavı* [SBS]) (previously referred to as TEOG) results, there are significant differences in academic performance between the genders and between different regions in Turkey. He explains that the focus on high stakes testing and college entrance exams results in teacher-centred approaches that emphasize memorization of facts and figures. Often students attend supplementary intensive learning programmes (*dersane*). He concluded that the Turkish education system has been considered to provide very few students with a good education, with high failure rates (Sarier, 2010).

In the literature, there are papers emphasizing the need for a reorientation of the Turkish national education practices to address sustainable development and to be more supportive of developing 21st century skills. There are signs that the ministry of education is revising the national curriculum to better prepare students for the future. The priorities for 2015 and beyond were described in the Development Agenda of Turkey for Post-2015 National Consultation Report published by the United Nations Development Group (2013). To increase quality of education, several recommendations were reported to the Turkish Ministry of National Education. One of these recommendations was that the emphasis on education must be to develop life skills more than the academic knowledge. Another recommendation for the Post-2015 Development Agenda was the need for an effective strategy for lifelong learning.

Despite some indications that the Turkish curriculum is changing to become more student-centred and future-oriented, researchers still express concern about the lack of attention on developing 21st century and other skills students will need for a

sustainable future (Alim, 2003; Demirbaş, 2011; Tanrıverdi, 2009; Yalçınkaya, 2013; Yapıcı, 2003). To address this shortcoming, some schools opt to integrate an international education programme into the existing curricula to help Turkish students become global citizens. For the current study, the international programme that is featured is the IBDP.

The IBDP can be considered more than a university preparation programme; it prepares students for a sustainable future. The question that then begs to be asked is: How are students prepared for the IBDP? Suldo et al., (2008) note that the IBDP has enormous benefits, but it is an challenging and demanding programme. Their study found IBDP students to be academically more successful compared to their peers who were studying a national curriculum; however, the IBDP students also reported having high levels of stress due to homework, studying for exams, getting good grades, and managing their time.

In preparation for the IBDP, some schools integrate international education programmes to enhance the Turkish national curriculum. A focus of current study is how do these programmes prepare students for the IBDP? Furthermore, what about schools that opt not to integrate an international programme? For this reason and others, the focus of this study is to learn how students in Turkey feel ready for the challenges and the requirement of the IBDP. Further insights are needed into how students can be better prepared for advance learning in their upper high school education.

Findings of studies investigating IBMYP and IGCSE

There have been limited investigations about how students are prepared for the IBDP. This section highlights studies that investigated the merits and shortcomings of two programs that precede IBDP are discussed: The International General Certificate of Secondary Education (IGCSE) and the International Baccalaureate Middle Years Programme (IBMYP). While the studies provide insights into the programmes, they do not necessarily discuss preparation for the IBDP.

Regarding the IBMYP, between 1994-2007 worldwide 336 public and independent schools worldwide adopted the programme. Sperandio (2010) identifies the following reasons why schools might implement the programme: the match between the IBMYP and the schools' existing philosophy and programme elements, the curriculum's implementation, its marketing value, branding and support of an external agency for quality control.

There is strong evidence that a key reason to adopt the programme however, is to prepare students for the IBDP. Reimers (2004) found in a research (including 375 schools, over 400 students, 60 of them who participated in both the IBMYP and the IBDP) that 71% of the participating schools adopted this reason. Although the IBO promotes the IBMYP as "excellent preparation for the Diploma Programme," there are few studies that have focused on understanding the extent to which IBMYP is an excellent preparation for IBDP. Ironically, his study revealed that there were limited correlations between the two programmes. For example, a correlation of + 0.092 existed between the extended essay component of the IBDP and participation in

IBMYP. Furthermore, no correlation was found between the IBMYP and final IBDP scores between students who have and have not participated in the IBMYP.

However, Reimers acknowledges that since the IBMYP gives some flexibility as to how each institution implements the programme, this finding may be influenced by the quality of education of the particular school.

He continues to note that although schools have invested significant amounts of time and money on IBMYP and hold the belief that IBMYP provides a strong pedagogical foundation, they are not finding that IBMYP provides the anticipated smooth transition between middle and high school. Therefore, he concludes that the IBMYP cannot claim to provide better preparation for IBDP compared to the other available programmes. Finally, he notes that because IBMYP provides a curriculum framework and IBDP is more content-driven, students may not receive the skills needed for succeed in the rigorous high school programme. The IBMYP's flexibility and its personal project may contribute to students' mastery of the IBDP's extended essay. Reimer also stated that parents' education level, school budget for resources, and student motivation may have affected the results of his particular study.

Kamalaldin, Michel and Sweet (2016) were able to find many similarities between the two programmes, however. When they were analysing IBO programmes in relation to education for sustainable development, they found that economy, environment, and society categories are all embedded in programmes of both IBDP and IBMYP. They emphasized that the required projects in IBMYP and IBDP also foster process and interpersonal skills.

Visser (2010) examined reasons why IBMYP schools in three different countries were adopting the IBMYP. He interviewed 21 IBMYP coordinators from Australia, Canada and USA and found that 11 of the coordinators reported that their principal reasons for adopting the IBMYP are its educational philosophy and relatedness with the IBDP as a model structure for their own curricula. Visser added to the point of views of coordinators and school management by noting that the IBMYP is serving the educational needs of a culturally and intellectually heterogeneous population. He claims that IBMYP is different than any other curriculum due to its international background and focus, its educational goals and curriculum design, and the extent to which theoretically any (national) curriculum could be taught according to the IBMYP's principles.

Ateşkan, Dulun and Lane (2016) reported that IBMYP coordinators emphasize that the programme provides students with opportunities to develop communication skills, inquiry skills and ways of applying their knowledge that are comparable to IBDP. However, the teachers reported that IBMYP is not focused on content knowledge as is required by IBDP which makes it a hard transition from IBMYP to IBDP. Students agreed on the need for a better bridge to prepare themselves for increased academic expectations and workload they will face in IBDP.

There have been some studies that have sought to find evidence that IBMYP helps prepare students for the academic challenges of the IBDP. The Australian Council for Educational Research (ACER, 2015) examined the impact and influence of IBMYP on student outcomes in IBDP from China, Hong Kong, India, Indonesia and Japan. The findings show that non-MYP students need a bridge to develop analytical

and evaluative skills to study IBDP successfully. According to the data they collected from second year IBDP students and IBDP teachers, they found that IBMYP helps the students develop critical thinking skills along with the ability to analyse and evaluate (higher order thinking skills). Other studies have also found that IBMYP students obtain much better IBDP exam scores compared to non-MYP students (Wade & Wolanin, 2015).

Regarding IGCSE, the other pre-IBDP programme investigated in the current study, Monteath (2015), regional director of Cambridge International Examinations (CIE), reports that there are an increasing number of schools desiring to implement IGCSE because of its international focus. He adds that even in England schools have started to choose IGCSE over General Certificate of Education (GCSE), the national curriculum for UK schools. The administrators of CIE note that IGCSE may be a useful pre-IBDP programme but emphasize that the programme has many other goals and priorities. Sagun and Corlu (2014) notes that compared to IGCSE, IBMYP does not have required external examination procedures which have been found to help prepare students for IBDP exams. Therefore, IGCSE is sometimes considered as advantageous due to its similar external exam conditions as in IBDP examination settings. Still, the overall effectiveness of these two curricula to prepare students for IBDP is unknown in the literature.

The above studies provide some indication that both IBMYP and IGCSE may help prepare students for the IBDP. Especially in Turkey, investigations into the outcomes of these programmes are limited to Sagun's (2014), and Corlu's (2014) research. Similarly, in the research done by ACER (2015) IGCSE and IBMYP students

reported to have developed literacy and writing skills which contribute positively to their studies in IBDP. To date, however, there have been no studies about how the students who are participating in only the Turkish national curriculum in grades 9 and 10 perceive they are prepared for the IBDP.

Theoretical framework for the study

As observed by the researcher at the beginning of this review, 21st century skills are important for preparing students to contribute to a sustainable future. The overview of international education highlighted how international mindedness in general and IBDP in particular develops learner profiles and approaches to learning that are comparable to 21st century skills. To provide a framework for the study, the main 21st century skill that is investigated is critical thinking. More importantly, the framework identifies two main areas of student preparation needed to develop critical thinking and 21st century skills: learning strategies and dispositions. For learning strategies, metacognition and self-regulated learning are the main focus of investigation and for dispositions the focus is on attitudes and motivation. These foci were selected because they were frequently mentioned in the literature and they have a strong overlap with 21st century skills, sustainability literacy, and goals of IBDP.

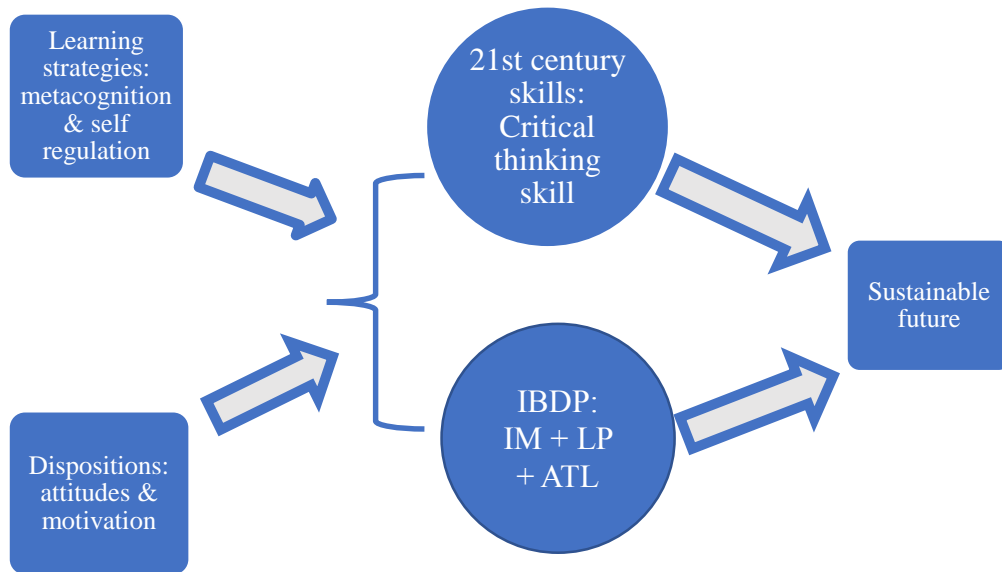


Figure 1. Research framework

Learning strategies needed by early adolescents

According to Piaget, adolescents (age of 11-19 years) are considered to be in formal operational stage and can hypothesize, predict and deduce logical and testable inferences which can be explained as their cognitive skills. Adolescents are known to have self-serve bias compared to adults; however, as their attention becomes selective, their reasoning skills improve, they can produce more effective strategies as their knowledge increases and metacognition expands (Berk, 2014). Their cognitive self-regulation is also known to improve, which is required for high academic performance as also reported by Yumuşak et al. (2007).

Several researchers (Pajares & Schunk, 2001; Pintrich & De Groot, 1990) have described effective learners based on students' use of cognitive and metacognitive strategies, rehearsal, elaboration, and organization strategies. Pajares (1996) and Schunk (1991) report that self-efficacy affects motivation, learning and achievement.

Yang (2005) notes that effective learners are usually more voluntarily engaged, which helps them better encode, recall and comprehend information. He also asserts that students must be motivated in addition to being goal-oriented; self-efficacy and having achievement value are also germane to their cognitive engagement. Achievement value means that some students need a compelling purpose to be engaged in their learning processes. Furthermore, students' purpose needs a perception of importance, utility and interest to make their learning effective.

Dispositions needed by adolescents

In their three year study conducted on grades 9 and 10 students, Li and Lerner (2013) concluded that school engagement is essential to achieve high standards of academic achievement. They go on to explain that positive and motivational thoughts are supportive to enhance cognitive capacity. Their study revealed that learning is affected by the interrelations between the behavioural, emotional and cognitive aspects of high school students. Li and Lerner found a bidirectional relation between behavioural and emotional engagement that impacts cognitive engagement. The characteristics of behavioural engagements include the amount of participation in academic work, attendance and the time that the student has spent on activities along with the intensity of his effort and willingness to comply with the school rules.

According to Social Cognitive Theory (SCT), learning and achievement depends on interactions among personal behaviours and environmental conditions (Bandura, 1986). Therefore, to be successful in rigorous programmes such as the IBDP, students need a compelling purpose to be engaged in their learning processes. As also supported by Meece (1997) students are more motivated to work and learn new

skills when their curiosity is aroused with interesting activities. Therefore, students' motivation and attitudes toward learning was another focus of the study. This domain is composed of factors such as students' motivational level, feelings, appreciation, enthusiasm, motivations, attitudes, perceptions and values (Kirk, 2009).

Summary

This chapter discussed the challenges that adolescents face and the skills they need to develop for a successful secondary education. The literature review showed the impacts of the three curricula under investigation for this particular study. Based on research, it is known that schools are relying on some prestigious curricula to prepare their students for the challenges of the future. One of these programmes, the IBDP, is reported to be a challenging programme that benefits adolescents' development. However, the stress levels of adolescents are found to be higher compared to their peers due to the high expectations set for them. The perspectives of IBDP students emphasized the importance of a well-designed pre-IBDP curriculum to function as a bridge to support future learning. Finally, a theoretical framework was presented that explains how specific learning strategies and dispositions are important to develop to prepare students for success in IBDP. The next chapter will explain how a comparative case study is used to analyse how these three different programmes prepare students for IBDP.

CHAPTER 3: METHODOLOGY

This chapter presents details about the research methodology used to answer the research questions for the current study. The study involved collecting quantitative and qualitative data to gain insights into students' perspectives about their preparation for the IBDP. Following is a description of the research design, context, case schools and participants. This chapter includes information about the data collection tools and analysis.

Research design

This is a comparative case study research (Yin, 2002), focusing on three different schools, to investigate how different programmes prepare students for the IBDP. The comparative case study is a broad, general research method that does not include random selection of cases but information-oriented cases (Lijphart, 1971). The focus of the study was on a small number of cases because there are relatively few instances of the phenomenon under consideration, namely approaches to IBDP preparation.

This comparative case study used mixed-methods sequential explanatory design to investigate the cases. In mixed-methods, sequential explanatory design, quantitative and qualitative data were collected and analysed in two consecutive stages (Ivankova et al, 2006). The use of mixed methods helped gain a variety of insights into students' perceptions of their educational development. The questionnaires (quantitative) were administered and the data were analysed, followed by other

qualitative data research methods. These consecutive stages helped triangulate the data since the researcher looked for convergence, corroboration and correspondence of results from these two methods (Greene et al, 1989).

Research context: Case criteria and selection

In 2016 when this study was conducted, there were 57 IB world schools in Turkey, 39 of which were offering the IBDP (IBO, 2016). According to Türkiye İstatistik Kurumu (TÜİK), in 2017, Istanbul (N=14,804,116) and Ankara (N=4,223,545) are the two cities with the largest population in Turkey (N=79,814,871). There are 27 schools, as shown in Table 2, which are located in these two cities and were potential cases for this study. The context for this study, shown in Tables 2 and 3, was accessed through the IBO's website (IBO, 2017a) and the CAIE's websites (CAIE, 2017). It should be noted that not all of the Cambridge schools listed in Table 2 are offering IGCSE. However they offer at least one subject from IGCSE curriculum such as English language and literature course to provide certification to their students.

Table 2
Number of private IB world schools and the offered programmes in Turkey

IB Programmes	No of schools	No of schools in Istanbul	No of schools in Ankara	No of schools in other cities
DP	29	12	7	10
MYP+DP	1	1	0	0
PYP+DP	4	2	1	1
PYP	13			
MYP	1	1	0	0
PYP+MYP	3	2	0	1
PYP+MYP+DP	5	3	1	1
Total	56	21	9	13

Table 3
Number of Cambridge schools and the offered programmes in Turkey

Cities	No of schools
Istanbul	16
Ankara	5
İzmir	2
Antalya	1
Erzurum	1
Total	25

Three cases, students from three different private high schools in the largest cities of Turkey, were selected for this investigation. Purposive sampling was used to select cases. All of these schools are following the IBDP for grades 11 and 12 but have different IBDP preparation programmes for their grades 9 and 10 students. One school uses the IBMYP (Case IBMYP), one the IGCSE (Case IGCSE), and one uses only the MoNEP (Case MoNEP). Additional information used to select the cases is listed in Table 4.

Table 4
Sampling criteria used for purposive sampling (√=yes; - = no)

	Case MoNEP	Case IGCSE	Case IBMYP
Offers IBDP	√	√	√
IBDP exams in May	√	√	√
Offers IBPYP	-	√	√
Offers IBMYP	-	-	√
Offers IGCSE	-	√	-
Follows MoNE requirements	√	√	√
Has its own primary school	-	√	√
Has its own middle school	-	√	√
Early starters of IBDP in the country	√	√	√
Serves Turkish students in majority	√	√	√
IB continuum school	-	-	√

An overview of the three private schools selected for this study is provided below. It is also important to note that each school has a different school culture and climate along with unique student profiles.

Case IBMYP: IBMYP-IBDP School in Istanbul is a private school. It has been recognized as an IB world school for over ten years. The school started with the IBDP, followed by IBMYP and IBPYP in 2005; thus, it is an IB Continuum School. There were 730 students enrolled in the school at the time of data collection.

Case IGCSE: IGCSE-IBDP School in Ankara is a private school. The school started to provide secondary level education by offering IGCSE in grades 9 and 10. It has been recognized as an IB world school for over ten years. It started with the IBDP, followed by IBPYP. There were 172 students enrolled in the school at the time of data collection.

Case MoNEP: MoNEP-IBDP School in Ankara is a private school which has been recognized as an IB world school for over ten years. There were 184 students enrolled in the school at the time of data collection.

All cases have been offering the IBDP for over ten years and have successfully completed at least one evaluation by the IBO. The language of instruction is English for the pre-IBDP years in grades 9 and 10. For the students who need to improve their English speaking and writing skills before grade 9, there is a preparation year in which all the courses, except Turkish language and literature, are delivered in English.

To secure the anonymity of the participants' personal information and to ensure the safety of the research, initial permission from the Ministry of National Education was obtained in order to be able to visit the case schools to collect desirable data. Then the parents' permission was obtained by the schools via consent forms. The researcher visited the case schools in an agreed time period to collect the data.

The cases for this study are not representative of the Turkish education population in general because the cases are all private schools that make up 4.09% of Turkey's educational institutions (MEB, 2016). However, all three cases are IB schools that are authorized by the IBO and have successfully completed at least one evaluation by the IBO to successfully continue implementing the programmes.

Each school was treated as a separate unit, although the outcomes of the programmes were compared and contrasted with each other. This analysis helped the researcher obtain a comprehensive understanding of how students perceived their learning strategies, dispositions, and how cognitive skills were developed in preparation for the IBDP.

Comparability of the cases

To ensure that all cases are comparable with each other, academic data was gathered, analysed, and compared from school records for students who graduated between 2012 and 2015. Since every case school in the study was required to implement the Ministry of National Education programme, it was considered to be a good indicator of the impact of each programme on students' academic success at the end of grade

10. Firstly, the data were analysed to compare the mean MoNEP and IBDP scores from each case by using one-way ANOVA. Secondly, one-sample *t*-test was used to compare how the students from three different cases performed in IBDP in comparison to the world average.

Collection of academic scores for IBDP Scores

All of the grade 12 IBDP students take externally prepared and marked examinations for their registered courses at the end of their 2-year diploma programme in May. The students have the flexibility of choosing any combination of courses in the IBDP. Since in the MoNEP students are required to have scores for some common courses, the following were considered for the statistical analysis: First language (Turkish), First/Second language (English), mathematics, biology/physics/chemistry or coordinated science scores.

Collection of academic scores for Case IGCSE

IGCSE students are taking externally prepared and marked examinations for each subject area in May and June when they are about to finish tenth grade, the final year of the 2-year IGCSE. The students involved in this study were registered to take several subject courses however the following courses were considered in the statistical analysis since these are also the same with the MoNEP courses: Turkish, English, mathematics, physics, chemistry, and biology.

Collection of academic scores for Case IBMYP and Case MoNEP

IBMYP students are taking the same courses as MoNEP students, although the content of each may differ to a certain extent due to the IBMYP framework. Since

the students are taking the IBMYP in their mother tongue, Turkish, and IBO does not have Turkish examiners who are capable of marking students' exams and products, IBO does not provide the Turkish students with externally moderated scores.

Therefore the IBMYP students' tenth grade MoNEP scores for the following courses are also obtained: Turkish, English, mathematics, physics, chemistry, and biology.

For Case MoNEP, as was done with Case IBMYP, their MoNEP scores and IBDP scores were collected from the earlier years.

Collection of academic scores for IBDP Scores

All of the grade 12 IBDP students are taking externally prepared and marked examinations for their registered courses at the end of their 2-year IBDP in grade 12 in May. The students have the flexibility of choosing any combination of courses in IBDP. Since in MoNEP the students are required to have scores for some common courses, they were considered in the statistical analysis: First language (Turkish), First/Second language (English), mathematics, biology/physics/chemistry or coordinated science scores. The average IB diploma scores for the cases in this study were above the world average, which further supports the comparability of the schools. Out of a possible score of 45 for the IB diploma, students from Case IGCSE scored an average of 32 and Cases IBMYP and Case MoNEP each had a mean score of 33.

Firstly the assumptions to conduct one-way ANOVA were all checked. Then the academic data were analysed by using one-way ANOVA in SPSS 22.0 to see whether there was any statistically significant difference between students' grade 10

MoNEP scores and IBDP overall scores. It was found that there was a significant difference between the means of students' MoNEP scores ($F(2, 302)=9.72, p< .05$). A post hoc Tukey test showed that Case MoNEP students have the highest mean scores among the cases whereas the case IGCSE students have the lowest mean score.

It was also found that there was not a significant difference between the means of students' IBDP overall scores ($F(2, 302)=1.88, p= .154$).

In addition to this, the one-sample *t*-test was conducted to compare how the students from the three different cases performed in IBDP in comparison to the world average. It was found that all cases: IBMYP, IGCSE, and MoNEP have significantly higher mean IB diploma scores than 30.5 (world average); $t(124)=5.50, p< .05$; $t(133)=6.33, p< .05$; $t(45)=6.68, p< .05$ respectively. Further information about the collection of academic scores for the cases is given below.

Stages of the research study

The stages of the research were guided by the research questions. Research question 1 was addressed through the review of the official documents from UNESCO, UN, and IBO, which involved a document analysis of how the learning goals of the IBDP contribute to the selected 21st century skills that students will need in order to develop a sustainable future. The review is supplemented with insights gained from research questions 2, 3, and 4. To address questions 2 and 3, two consecutive stages were composed: A quantitative stage followed by a qualitative stage. Therefore, the

research questions were revised slightly to add more specific quantitative questions. Research question 4 was included in the qualitative stage, which was through a document analysis. An overview of the research questions and the analysis used to address each one is provided in Table 5.

Table 5
Research questions and data sources for the study

Research questions	Analyses
<i>Research question 2a.1:</i> Is there a statistically significant difference between the mean self-regulation scores of MoNEP, IGCSE and IBMYP students?	Self-regulation questionnaire
<i>Research question 2a.2:</i> Is there a statistically significant difference between the mean metacognition scores of MoNEP, IGCSE and IBMYP students?	Metacognition questionnaire
<i>Research question 2b:</i> How do students perceive that the MoNEP, IGCSE, and IBMYP help develop their learning strategies, in particular metacognitive skills and self-regulated learning, in preparation for IBDP?	Focus group interviews (question 11)
<i>Research question 3a.1:</i> Is there a statistically significant difference between the mean motivation scores of MoNEP, IGCSE and IBMYP students towards learning?	Motivation questionnaire
<i>Research question 3a.2:</i> Is there a statistically significant difference between the mean attitudes scores of MoNEP, IGCSE and IBMYP students towards learning?	Attitudes questionnaire
<i>Research question 3b:</i> How do students perceive that the MoNEP, IGCSE, and IBMYP influence their dispositions, in particular attitudes and motivation, in preparation for IBDP?	Focus group interviews (questions 3, 4, 5)
<i>Research question 4:</i> How do students from MoNEP, IGCSE, and IBMYP compare in how they exhibit aspects critical thinking skills?	Focus group interviews (questions 6, 7, 8, 9, 10)
	Students' projects

Quantitative stage (for research questions 2 and 3)

Quantitative data was collected from the students via the questionnaires. Further information about the instrumentation is provided after the next section.

Participants in the quantitative stage

The sample for the questionnaires was all the Turkish students, from each case, who were registered in grades 10 and 11 (Table 6). The total number of participants in this stage was 193 students whose ages ranged between 16 and 19 years.

Table 6
Number of students who participated in the first part of quantitative study (student questionnaire)

Case	No of female students	No of male students	Non-reported	Total
Case IBMYP	50	40		90
Case IGCSE	26	29	1	56
Case MoNEP	19	19		38
Total	95	88	1	193

Grade 10 students were approaching the end of pre-IBDP preparation (MoNEP, IGCSE or IBMYP). They were able to give their perspectives of how they felt their respective programme was preparing them for the IBDP. IGCSE and IBMYP both end in grade 10. Grade 11 students' perspectives were considered to be significant by the researcher since they had already experienced IBDP for three months and had an understanding of which skills they had developed and which were still in need of improvement. Further information about the questionnaire participants is provided in Tables 7 through 12. The tables illustrate demographic information for each case.

Table 7
Information about Case IBMYP student participants' grade level and gender distribution in the quantitative stage

Case		No of female students	No of male students	Total no of students per grade level
Case IBMYP	Grade 10	39	27	66
	Grade 11	11	13	24
Total		50	40	90

Table 8
Information about Case IBMYP student participants' parents' level of education

Level of education	Mother	Father
Literate	1	1
Primary	0	0
Secondary	1	1
High school	12	12
University	54	47
Master/PhD	22	29
Total	90	90

Table 9
Information about Case IGCSE student participants' grade level and gender distribution in the quantitative stage

Case		No of female students	No of male students	Total no of students per grade level
Case IGCSE	Grade 10	13	16	29
	Grade 11	14	13	27
Total		27	29	56

Table 10
Information about Case IGCSE student participants' parents' level of education

Level of education	Mother's	Father's
Literate	0	0
Primary	0	0
Secondary	0	0
High school	2	0
University	37	19
Master/PhD	16	36
Non-reported	1	1
Total	56	56

Table 11
Information about Case MoNEP student participants' grade level and gender distribution in the quantitative stage

Case		No of female students	No of male students	Total no of students per grade level
Case MoNEP	Grade 10	9	15	24
	Grade 11	10	4	14
Total		19	19	38

Table 12
Information about Case MoNEP student participants' parents' level of education

Level of education	Mother's	Father's
Literate	0	0
Primary	0	0
Secondary	0	0
High school	3	0
University	20	20
Master/PhD	15	17
Non-reported	0	1
Total	38	38

Instrumentation for the quantitative stage

There were four questionnaires that were used for the study, each had Likert type scaled items: Self-regulation, Metacognitive, Motivation, and Attitudes (Appendix A). The items of the motivation, self-regulation, and metacognition questionnaires were rated on a 7-point scale in which the scale has a range from 1 (strongly disagree) to 7 (strongly agree). For these questionnaires the collected data was coded ranging from 1 for "not at all true for me", to 7 for "very true of me". The attitudes questionnaire items were rated on a 5-point scale. After collecting the data, the Likert scale points were calculated for each student and coded ranging from 1 for "not at all true for me", to 5 for "very true of me" for the attitudes questionnaire. All of these

questionnaires were adapted from existing validated and reliable questionnaires that included items relevant to the research questions. The parent questionnaires for the self-regulation, metacognition and motivation questionnaires were the Motivated Strategies for Learning Questionnaire (MSLQ) and for the attitudes questionnaire the researcher used the Patterns of Adaptive Learning Scales (PALS). Information about the four questionnaires is provided in Table 13.

Table 13
Details of original instruments for the questionnaire

Questionnaires	Main tool	N of items	Authors	Sample item
Self-regulation	MSLQ (Turkish)	8	Karadeniz et al., 2008	When studying for a course I try to determine which concepts I don't understand well.
Metacognitive skills	MSLQ (Turkish)	10	Karadeniz et al., 2008	When reading for a class, I try to relate the material to what I already know
Motivation	MSLQ (Turkish)	9	Karadeniz et al., 2008	When I have the opportunity in a class, I choose course assignments that I can learn from even if they don't guarantee a good grade.
Attitudes	PALS	7	Midgley et al., 2000	Even if the work is hard, I can learn it.

The MSLQ measures students' self-regulated learning strategies, metacognitive skills and motivational beliefs. It has been used in many countries, with students from primary school to university level. In 2000, the MSLQ was used by the Programme for International Student Assessment (PISA) to determine the effects of cultural similarities and differences of countries on strategies of motivation and

learning. Another study conducted in Turkey, used the MSLQ to determine the motivation levels and learning strategies of secondary education students. The instrument was administered by the Social Sciences and Humanities Research Group with support from the Scientific and Technological Research Council of Turkey (TUBITAK) and the Ministry of National Education Research and Development Department (Karadeniz, Büyüköztürk, Akgün, Çakmak, & Demirel, 2008).

The attitudes questionnaire included six items from PALS and measured attitudes toward learning. This is a valid tool that has been used with many populations and with a range of grade levels (Midgley et al, 1998). It was developed by researchers from Michigan University to examine how the learning environment and students' motivation levels and behaviours are related and has been used in several studies (Kitsantas, Steen, & Huie, 2009; Mascret, Elliot, & Cury, 2015; Matos, L., Lens, W., Vansteenkiste, M., & Mouratidis, A., 2017; Ruzek, Hafen, Allen et al., 2016).

After the selection of the questionnaire items, the authors of the instruments were contacted to secure their permission. For the self-regulation, metacognition, and motivation questionnaires the Turkish version of MSLQ (Table 13) was used to ensure good quality translation in items. The items in attitudes questionnaire were translated from English to Turkish because the parent tools were originally in English. Then they were back translated by a colleague to ensure reliability. Next, the questionnaires were piloted in an IGCSE and a IBMYP school (either of which were a case study school) to ensure their reliability.

Data collection during the quantitative stage

Data collection started after receiving permission from the Turkish Ministry of National Education. The schools were contacted to secure their agreement in participation. The researcher visited the case schools at a set time to administer the student questionnaires. All four questionnaires were administered at the same time.

All students in grades 10 and 11 from the three case study schools successfully completed the questionnaires. The questionnaires aimed to collect data on recent perceptions of pre-IBDP experiences and thus grade 12 students were not included in the quantitative phase of the study. While the students were completing the questionnaires, the researcher was present to answer possible concerns and questions of the students. Students completed the questionnaire within 30 minutes.

Construct validity and the reliability

Construct validity of each questionnaire was tested by using SPSS 22.0. A correlation analysis supported the construct validity of the questionnaire showing that the relationships between the variables are of the same construct. Internal consistency of all the items in each questionnaire was checked by using Cronbach's *alpha*. The Cronbach's *alpha* coefficients for self-regulation, metacognition, motivation, and attitudes questionnaires were 0.87, 0.64, 0.85, and 0.87, respectively. When *alpha* coefficients are below 0.70, internal consistency of scores can still be acceptable at the early stages of the research (Nunnally, 1978). Therefore, reliability of the scores in this current exploratory study is acceptable (Hair, Anderson, Tatham, & Black, 1995). In addition, corrected item-total correlations between items were reported to measure the consistency of the items from each questionnaire in Tables 14, 15, 16, and 17.

Table 14
Item-total statistics for self-regulation questionnaire

Items of self regulation questionnaire	Corrected item-total Correlation	Cronbach's <i>alpha</i> if item deleted
1	.579	.832
2	.431	.852
3	.637	.825
4	.591	.830
5	.697	.818
6	.638	.824
7	.696	.816
8	.459	.845

There were eight items in the self-regulation questionnaire that are from the same construct as provided in Table 14. Due to the high internal consistency none of the items was excluded.

Table 15
Item-total statistics for metacognition questionnaire

Items of metacognition questionnaire	Corrected item-total Correlation	Cronbach's <i>alpha</i> if item deleted
1	.608	.859
2	.528	.864
3	.694	.851
4	.475	.870
5	.463	.870
6	.530	.865
7	.650	.855
8	.631	.856
9	.690	.852
10	.680	.852

There were 10 items in the metacognition questionnaire that are from the same construct as provided in Table 15. Due to high internal consistency none of the items was excluded.

Table 16
Item-total statistics for motivation questionnaire

Items of motivation questionnaire	Corrected item-total Correlation	Cronbach's <i>alpha</i> if item deleted
1	.512	.861
2	.503	.862
3	.654	.848
4	.599	.854
5	.649	.849
6	.642	.850
7	.559	.859
8	.594	.854
9	.719	.844

There were nine items in motivation questionnaire that are from the same construct as provided in Table 16. Due to high internal consistency none of the items was excluded.

Table 17
Item-total statistics for attitudes questionnaire

Items of attitudes questionnaire	Corrected item-total Correlation	Cronbach's <i>alpha</i> if item deleted
1	.467	.575
2	.198	.671
3	.363	.608
4	.332	.611
5	.394	.598
6	.468	.584
7	.397	.593

There were seven items in attitudes questionnaire that are from the same construct as provided in Table 17. Due to acceptable internal consistency none of the items was excluded.

Data analysis for the quantitative stage

Firstly, the data were explored with respect to normality and outliers. Violations were checked by using standardized scores, skewness, and kurtosis (Tabachnick & Fidell, 2007). Normality was checked with skewness and kurtosis values across variables; skewness for self-regulation, metacognition, motivation, and attitudes questionnaires ranged from -1.06 to -.61, -.35 to -1.0, -.32 to -.70, and .01 to 1.47 and kurtosis ranged from -.41 to .72, -.76 to .57, .40 to -.81, and -1.07 to 2.56 respectively. The data are considered adequate with a skewness of less than 2 and a kurtosis of less than 7 (West, Finch & Curran, 1995). Therefore, the data were assumed to be normally distributed. No outliers were detected because the absolute value of the z score was not exceeding 4 (Shiffler, 1988). Missing values were determined and excluded list-wise.

For the quantitative data, descriptive statistics for the frequency of responses were conducted by using SPSS 22.0. The data were analysed at the questionnaire level using one-way ANOVA for any significant differences between the cases.

Qualitative stage (for research questions 2, 3, and 4)

The qualitative stage was comprised mainly of focus groups (research questions 2, 3, and 4), along with a content analysis of student work (research question 4). The focus groups were designed to gain deeper insights into students' perceptions of their respective pre-IBDP programs. To help the participants state their views openly and to listen and react to their co-participants, a semi-structured interview format was used (Gall et al, 2007).

Participants in the qualitative stage (focus group interviews)

The main criteria considered in selecting the participants was to ensure they had participated in the quantitative-stage. Participants in the qualitative state were selected by the programme coordinators from each case. A total of 56 students participated in the focus groups (see Table 18). The coordinators were asked to randomly select students from grades 10, 11 and 12 for focus groups, yet to make they were academically mixed: One-third of high achievers, one-third middle achievers and one-third of low achievers. Therefore, purposeful sampling strategy was used for this stage to identify an audience who helped the researcher gain in-depth understanding of the cases under consideration (Patton, 2002). Grade 10 students were included because they were aware of what was expected of them in IBDP and asked to share perceptions of preparation in their current and previous grade. Grade 11 students had been experiencing IBDP for several months and grade 12 students were in their second year of IBDP. The upper high school students were asked to reflect on their preparation in lower high school and share thoughts on what worked to prepare them and what they felt needed improvement. The eleventh grade students had a new awareness of what IBDP entailed while the students in their second year had a more comprehensive understanding of the expectations and skills needed to be successful in IBDP.

Table 18

Number of students who participated in the qualitative study (focus groups)

Case		No of female students	No of male students	Total no of students per grade level	Total no of students per case	No of groups per case
Case IBMYP	Grade 10	4	2	6		
	Grade 11	5	2	7	18	3
	Grade 12	3	2	5		
Case IGCSE	Grade 10	3	4	7		
	Grade 11	1	6	7	22	3
	Grade 12	6	2	8		
Case MoNEP	Grade 10	3	3	6		
	Grade 11	4	1	5	16	3
	Grade 12	4	1	5		
Total		33	23	56	56	

Instrumentation for the qualitative stage (focus groups)

The 12 open-ended questions that were asked during the focus groups are provided in Appendix B. They were developed in light of the findings from the analysis of the questionnaire (quantitative stage). The main themes of the questions and the number of questions for each theme are shown in Table 19. The questions were reviewed by Dr Lane (supervisor) and Dr Teksöz (dissertation committee member) for accuracy and clarity. The tool was validated through a pilot interview for face validity with an IBDP and IGCSE teacher and two IBDP students in an IB school. The questions were intended to help the researcher develop a deeper understanding about students'

perspectives on their learning strategies, metacognitive skills, motivational levels, attitudes, and critical thinking skills. There was also a question where students were asked to provide their understanding of the definition of sustainability.

Table 19
Main themes of the interview questions

Main themes	Number of questions
General questions for recommendations to improve program	2
Motivations	3
Critical thinking	4
Self-regulation	1
Sustainability	1
Total	11

Data collection for the qualitative stage (focus groups)

The researcher arranged the time and place for the focus groups with the school programme coordinators. There were three focus groups for each case, one group for each of the three grade levels. In total, there were nine focus groups from all cases. Each group was interviewed one time. The focus group sessions lasted about 45 to 60 minutes each.

Before beginning the interview, the respondents were assured about confidentiality. She reminded them of the informed consent and that they could leave the group at any time. The researcher introduced herself as a PhD candidate who is also actively teaching at a private school, to establish trust. After introducing herself, she explained the purpose of the investigation and expressed appreciation for their participation.

The 11 questions are asked orally and in the same order for all focus groups. For two of the questions, participants wrote their answers first and then shared their responses. These questions were about definitions of critical thinking and sustainability. They were also given a list of supportive learning resources and asked to check which ones motivated them before sharing their responses orally.

During the interview, the researcher avoided hinting by tone of voice or specific comment. To preserve the information obtained through the interviews, the interviews were recorded after securing permission of the participants.

Data analysis for qualitative stage (focus groups)

The qualitative data analysis used NVivo 8 software to conduct a content analysis of transcribed data and to identify key major themes so that the interpretations in focus interviews can be refined. For these themes, an *a priori* code list was used: metacognitive skills, self-regulation, motivation, and attitudes toward learning. The researcher conducted the original analysis that was then cross-checked by the two experts in the area. The selected themes and codes were examined by an external reviewer, who is an expert in IBDP, to ensure compliance. After the themes and related content were organized, the researcher selected and translated quotations from the transcripts that exemplified the themes. The external reviewer translated the quotes as well to ensure accuracy and relevance.

During the focus groups, students were asked to describe critical thinking and if they considered themselves to be critical thinkers. Since critical thinking was a key area of investigation for this study, she decided to conduct a document analysis of student

projects to increase the trustworthiness of the focus group findings (Angrosino & Mays de Perez, 2000). Information about this part of the qualitative study is found below.

Document analysis of student projects for the qualitative phase (research question 4)

Document analysis as a qualitative data collection method is a systematic approach to review and evaluate documents. The data is required to be examined and interpreted to gain deep understanding and develop knowledge (Corbin & Strauss, 2008; see also Rapley, 2007). According to Yin (1994), document analysis is applicable to case studies and Merriam (1988) also adds that the documents can help the researcher to develop insights relevant to the research question.

For the current study, document analysis of samples of students' projects were conducted to provide further insights into students' critical thinking skills. To avoid biased selectivity (Yin, 1994) interviewees were asked to share their projects which were completed at the end of grade 10. The documents used in this method were collected and recorded without the intervention of the researcher. The details and description of the student projects used in document analysis are provided in Table 20.

Table 20

Description of student projects

Cases	Name of project	Description of the projects
MoNEP	Term Project	The project can be conducted within any course that the student is studying in grade 10. This can either be a scientific research or an experiment under laboratory conditions for a science course whereas it is usually research-based for other subject areas. The aim of the project is to improve students' research and communication skills. The criteria to evaluate the project is prepared by each school's own teachers (MEB, 2016).
IBMYP	Personal Project	This student-planned learning activity serves to extend knowledge and understanding and develop their skills. It provides opportunities to the learners to explore through inquiry, action and reflection. It is a criterion-referenced product which requires students to understand the criteria to get a high grade. It also allows students to reflect upon their own learning in a separate reflection journal (IBO, 2018).
IGCSE	Term Project	There is no obligation to conduct a project or research to complete the IGCSE studies successfully. However, as a requirement of MoNE the students who follow IGCSE curriculum must also address this requirement in the end of grade 10. Therefore the requirements of this project are same with the MoNEP term project above.

The document analysis involved reading selected student projects, analysing them using a rubric, and triangulating the results with the focus group question where students were asked to define critical thinking. The rubric used was the Holistic Critical Thinking Scoring Rubric (HCTSR) developed by Facione & Facione (2009). The rubric originally had four levels from strong (4) to weak (1) to score the critical thinking holistically; it was modified to three levels: strong, acceptable, and weak (see Appendix C). Although Facione and Facione (2009) indicate that a high degree of internal consistency can be achieved by working alone, they noted that multiple

raters provide higher reliability. For the current study, were two raters involved in evaluation of the documents, one was the researcher and the other was her graduate supervisor, Dr Lane. Through a practice session, the raters standardized their scoring to agree on the meanings of the levels and the criteria.

The two raters evaluated each document independently. In total they evaluated and scored three documents from each case, the documents came from different subject areas but were all written in English. When the raters disagreed on a score, the average of the two ratings was taken. They also reviewed the evidence together to decide upon a final score. To ensure a high quality assessment, strong concurrence is needed between the raters. The inter-rater reliability was calculated and found to be 0.78%.

Summary

This chapter provided information about the study's comparative case study methodology, participants, and the stages. Three case schools were studied in which three different high school programmes are implemented in grades 9 and 10 to prepare the students for the IBDP. These case schools were implementing IGCSE, IBMYP and only MoNEP. The students studying in grades 10, 11 and 12 were involved in different stages of the study.

The literature review discussed in the previous chapter helped address the first research question for the study by relating the IBDP to 21st century skills for a

sustainable future. The subsequent research questions provided further information about selected skills and attributes students need for their lives. To address these questions, the study used mixed research methodology to collect data about students' perspectives on the development of their learning strategies, dispositions, and critical thinking skills.

The study consisted of two consecutive stages: quantitative and qualitative. For the quantitative stage the questionnaire was conducted with grades 10 and 11 students from each case to see their perspectives on how they think they are prepared for the IBDP. Then to gain deeper insights into students' responses, focus groups were conducted with students from grades 10, 11 and 12 in the qualitative stage. To increase the reliability of the students' responses in interviews about critical thinking, sample projects completed at the end of grade 10 were collected for document analysis. Descriptive statistics from the questionnaires were analysed through SPSS were triangulated with the qualitative data from interviews to verify the themes. The next chapter provides the data analysis of this study.

CHAPTER 4: RESULTS

Introduction

As presented in the methods chapter, the stages of the research were guided by the specific research questions. This chapter provides results for each stage of the research. The results for the first research question briefly revisits the literature review that explored how the IBDP goals help students develop learning strategies, dispositions, and critical thinking skills that may contribute to the development of selected 21st century skills students will need for a sustainable future.

The quantitative results for questions 2 and 3 are each followed by qualitative findings. The quantitative findings of this study are presented along with the descriptive statistics at the item level. The descriptive statistics give a better understanding of how the students from each case responded to each item in the questionnaires. Following the descriptive statistics, the results of the one-way ANOVA is provided. The review is supplemented with insights gained from research questions 2, 3, and 4.

In the discussions, the programmes are related to each other. Through this triangulation process, the researcher gained insights into how students perceived that the programmes developed their learning strategies and dispositions.

To answer the fourth research question and gain a deeper understanding of students' cognitive skills, in particular critical thinking skills, one of their major projects completed in grade 10 was investigated along with their self-reporting during the focus group interviews. Students' perceptions on their own critical thinking skills, as reported in the focus group interviews, were compared and contrasted with the results gathered from the project analysis.

Finally, additional insights about the MoNEP, IGCSE, and IBMYP (in grades 9 and 10) were provided by students from all three cases. The researcher highlighted key findings that students reported as supporting the development of their skills and dispositions needed to be successful in the IBDP. Student recommendations are also reported.

Results for research question 1: Contributions to 21st century skills

Research question 1 involved an analysis of how the learning goals of the IBDP contribute to selected 21st century skills students will need in order to develop a sustainable future. The researcher selected learning strategies, dispositions, and critical thinking for the focus of the study. After the literature review, the researcher could relate the IBDP learner profile Attributes and Approaches to Learning to the selected 21st century skills.

During the quantitative and qualitative stages of the study, the researcher gained insights into how students think their respective pre-IBDP programmes developed these skills. These are discussed further in the results for research questions 2, 3, and 4.

In addition to the selected skills of the study, students identified several other skills they felt were enhanced through the programme. They provided the researcher with the classes and experiences in which they perceived these skills were developed.

Most notably, students from all cases discussed the importance of communication skills, including presenting, writing, and argumentation. Grade 10 MoNEP students reported that the presentations they held in literature courses develop their presentation skills. They said these experiences helped them in other classes. One student shared, “We recognize the similarities between different courses. In history and Turkish literature courses we talk about the same era. I think the more closely related the courses, the better we learn. I feel like except mathematics, biology and literature courses all the others are a repetition of what we previously learned.”

Grade 10 IBMYP students reported that they learned writing in a structured way which will help them in IBDP assignments. They also told that they learned how to do citation and how to give reference along with their improved research skills. One student shared, “We learned the term ‘fool proof.’ I learned that if I am proposing an argument then I also need to ask ‘why and how questions.’ We basically learned how to relate cause and effect relation.”

Grade 10 MoNEP students reported that they believe the pre-IBDP will mostly help them in aspects of learning the terminology in the English language. They stated that they also improved their presentation skills and lab report writing skills with the help of the pre-IBDP. In the regular national programme the exams are different to the IBDP exams. One student shared, “Pre-IBDP will help us because we speak and

write in English. We are being prepared to do the homework in the IBDP in the English language.”

Students from Cases IGCSE and Case IBMYP were most vocal about their positive experiences regarding learning communication skills. In a previous study, the IBMYP coordinators emphasized that the programme provides students with opportunities to develop communication skills, inquiry skills and ways of applying their knowledge (Ateşkan, Dulun, & Lane, 2016). One grade 12 student who had been in the IBMYP stated, “We improved our analysis skills through the book analysis we did. Now we use this skill in IBDP.” Another student said, “We learned how to write in a structured way. Even in mathematics, we write by using mathematical language.” These findings are similar to those reported by ACER (2015). In that study, IGCSE and IBMYP students reported they had developed literacy and writing skills that contributed positively to their studies in the IBDP. Although not as vocal, MoNEP students also gave credit to their literature classes. One former MoNEP student who was then in grade 11 of the IBDP stated, “This year we are writing opinion papers in our course, Turkey in the Twentieth Century and our economics course. The essays that were written in the Turkish language and literature course we took last year are now helping us in IBDP because they improved our writing skills.” Another grade 11 student added a similar comment to IBMYP students, “We learned how to analyse a book in Turkish language and literature courses. We applied our analysis skills in English language and literature course.”

Despite some positive comments about the value of the literature classes, the MoNEP students did note that the national programme normally does not emphasize communication skills. One student stated, “We do not have opportunities in the national curriculum to improve our speaking, essay writing and presentation skills or make mathematical links and proofs.” However, when they are on track to enrol in the IBDP, they take courses that provide them with more opportunities and experiences to improve their writing and presentation skills. One of the Case MoNEP grade 10 students shared that, “When we deliver our presentation to the class we also improve our communication skills. We express our thoughts more comfortably.”

In addition to the importance of writing skills for the Extended Essay, the students relayed that communication skills were valuable for specific courses, such as science. These skills are especially important because in the IBDP all students need to take at least one science course that includes self-directed experimental studies. Evaluation of their lab reports influence their overall diploma score. In particular, Case IBMYP students reported that literature courses helped them improve their lab report writing skills. As one of the grade 10 then currently enrolled in the IBMYP students stated:

We learn how to write letters and essays in English language and literature course. We are expected to compose a three paragraph document [introduction, message, and conclusion]. I do not exactly remember which ones but teachers in other subject areas were referring to our English and language classes. They emphasized that these skills will be important not only in English, but in other subjects.

Students reported that their pre-IBDP lab report writing experiences increased their confidence and motivated them to conduct their investigations within the programmes. Although students from all cases reported that they practiced lab report writing, the IBMYP students seemed to have more opportunities. When reflecting on their pre-IBDP years, MoNEP students reported that they developed lab report writing skills, yet they were still feeling uncomfortable in the IBDP. As one of the former MoNEP students in grade 12 stated:

We were writing some sort of lab report however these were not even close to the level that we write in IBDP. Writing a lab report in an academic language is challenging. It would have been great if we had learned how to write a lab report that used assessment criteria.

While all cases mentioned writing skills as a motivator, only the IBMYP students discussed the importance of the research skills they gained in their pre-IBDP experience.

After asking questions about various skills they perceived were developed during their pre-IBDP years, the researcher was curious about their conceptions of sustainability. When they were asked to define the term “sustainability” most students had difficulty. This is despite the fact that all students learn through the national curriculum which includes the term in one of its general regulations:

In the vision of the science and technology curriculum in MoNEP, it has been emphasized that the aim is to develop scientifically literate individuals who are problem solvers, decision makers, self-confident, collaborative, and effective communicators as much as they are very well aware of the importance of sustainability. (MoNE, 2013)

Only the IBDP students (from grades 11 and 12) who take the course “Environmental Systems and Societies” were best at providing a definition that mirrors one found in the literature.

When all the students were asked about reasons for sustainability education, again very few could provide a rationale. One grade 10 IBMYP student shared his/her thoughts on the reasons for providing high school students with sustainability education as follows:

In order to support our future generations, we all must act for our future. When we think about the next generation actually we also build our future, too.

Although students from all three cases had difficulty defining and explaining sustainability, there is evidence they are developing skills they can use to contribute to a sustainable future. In addition to their communication skills described above, the results from the following research questions provide evidence about the perceived development of their learning strategies, dispositions, and critical thinking skills.

Quantitative results for research question 2: Learning strategies

Overall, the mean responses of all students in all three programmes perceive that their pre-IBDP preparation supported their learning strategies. In particular, they agreed that they use metacognitive techniques such as questioning what they learn, creating outlines and diagrams, and relating what they learn to other materials and information.

Descriptive statistics

In the questionnaire, students from all three cases indicated that they have good study and learning habits. One of the higher response rates for all three cases was that they make sure they keep up with the weekly readings and assignments for the courses, ($N_{\text{MoNEP}}=43$, 75%, $N_{\text{IGCSE}}=61$, 84%, and $N_{\text{MYYP}}=120$, 72%). The mean responses for all the items are shown in Table 21.

Table 21
Descriptive statistics of students' perceptions on how the programmes had impact on their self-regulation

Item no	Item	IGCSE <i>M (SD)</i>	MoNEP <i>M (SD)</i>	IBMYYP <i>M (SD)</i>
1	study place to concentrate	5.79 (1.13)	5.63 (1.45)	5.74 (1.45)
2	regular place for studying	5.44 (1.28)	4.49 (1.96)	5.09 (1.85)
3	do weekly assignments	5.64 (1.60)	5.42 (1.42)	5.32 (1.41)
4	manage working till finish	4.98 (1.82)	4.67 (1.73)	4.91 (1.61)
5	determine what's not understood	5.31 (1.41)	5.23 (1.59)	5.38 (1.37)
6	set goals for himself	4.80 (1.59)	4.47 (1.75)	4.99 (1.59)
7	organize class notes	5.08 (1.80)	5.26 (1.85)	5.45 (1.62)
8	apply ideas from readings in class	5.47 (1.56)	5.65 (1.33)	5.45 (1.36)

The first sub-question of the second research question asked if there are any significant differences among case study student responses about self-regulation. A one-way ANOVA was conducted to compare the means scores of three cases on self regulation. According to the one-way ANOVA results, the null hypothesis was accepted due to finding no significant differences ($F(2, 215)=.719$, $p=.489$) between the mean self-regulation scores of MoNEP ($M=5.10$, $SD=1.04$), IGCSE ($M=5.34$,

$SD=1.11$), and IBMYP ($M=5.31$, $SD=1.10$). The The observed power was .171 which indicates a larger sample size may be needed for statistical significance.

Overall, the mean responses of all students in all three programmes perceive that their pre-IBDP preparation supported their learning strategies. In particular, they agreed that they use metacognitive techniques such as questioning what they learn, creating outlines and diagrams, and relating what they learn to other materials and information. Details for all the items are listed in Table 22.

Table 22
Descriptive statistics of students' perceptions on how the programmes had impact on their metacognitive skills

Item no	Item	IGCSE <i>M (SD)</i>	MoNEP <i>M (SD)</i>	IBMYP <i>M (SD)</i>
1	develop own ideas	5.38 (1.32)	5.19 (1.22)	5.13 (1.48)
2	question readings	5.21 (1.58)	5.56 (1.40)	5.27 (1.40)
3	adapt way of reading	4.82 (1.89)	4.63 (1.79)	4.78 (1.69)
4	organize course material	5.00 (1.66)	4.67 (2.08)	4.97 (1.80)
5	discuss with peers	4.64 (1.63)	4.84 (1.74)	4.99 (1.58)
6	test his own understanding	4.72 (1.85)	5.19 (1.79)	5.17 (1.53)
7	think through a topic	5.05 (1.63)	5.64 (1.45)	5.50 (1.40)
8	relate with previous knowledge	5.37 (1.48)	5.70 (1.44)	5.15 (1.62)
9	relate his ideas with his learning	5.49 (1.61)	5.65 (1.48)	5.36 (1.52)
10	make connections between readings and concepts	5.31 (1.86)	5.28 (1.49)	5.28 (1.49)

The second sub-question of the second research question explored significant differences among case study student responses related to metacognitive skills. A one-way ANOVA was conducted to compare the means scores of three cases on

metacognitive skills. According to the one-way ANOVA results, the null hypothesis was accepted due to finding no significant differences ($F(2, 210)= 1.097, p= .336$) between the mean metacognition scores of MoNEP ($M=5.21, SD=.84$), IGCSE ($M=5.11, SD=1.19$), and IBMYP ($M=5.31, SD=1.10$). The observed power was .069 which indicates a larger sample size may be needed for statistical significance.

Qualitative results for research question 2: Learning strategies

During the focus group interviews, students from all the case study schools confirmed that they work regularly on their coursework assignments. They commented that the amount of time they devote to coursework depends on the type and quantity of class assignments. Students from MoNEP and IBMYP said they receive coursework almost every day.

Case IBMYP students discussed having to learn to manage their time better to handle all the course assignments. This was true for the other cases as well. One of the grade 10 IGCSE students reported, “My time management skill has been improved. I learned how to become more organized. Before I started the IGCSE, I was playing games when I am home and the coursework was just taking half an hour.”

Case MoNEP students mentioned that knowing they plan to enroll on the IBDP does encourage their teachers to conduct classes like an advanced international programme. They said that in tests taken during their preparatory courses, teachers

will often include questions from past IBDP examinations. Students from the other cases agreed that knowing they were preparing to enter the IBDP encouraged them to develop good learning strategies.

It appears that IGCSE students report they are confident in their readings and completing assignments. One possible reason for this difference may be that for students within the IGCSE programme, there is an international examination at the end of the two-year programme. During the focus group interviews, the IGCSE students frequently mentioned this exam.

The interviewees from all case schools mentioned studying for exams given in classes, but only IGCSE students mentioned any additional studying. For example, one former IGCSE student currently in IBDP grade 11 recalled setting time aside to review questions from past exams. Again, this may go to show that these students are more driven to pass an international exam the year before they start IBDP. As one Case IGCSE student noted:

I prefer studying in a room which is far away from technology. When I study for the exam I use my textbook to study the topics I found difficult. Then I re-organize the topics covered in the lesson according to the relation between each other.

Although Case MoNEP students do not have an international exam about content, they need to pass an exam that shows they are proficient in a second language to be eligible to enrol in the IBDP. The MoNEP students report that they value new

learning materials that spark their interest. Perhaps in this case, the emphasis on test preparation is stressful and students appreciate different and novel learning materials.

Quantitative results for research question 3: Dispositions

Descriptive statistics

The questionnaire revealed that students perceive they have positive attitudes and motivation toward learning. In fact, many reported that they feel certain that they can master the skills being taught in classes ($N_{\text{MoNEP}}=43, 77\%$; $N_{\text{IGCSE}}=60, 78\%$; $N_{\text{MYP}}=121, 66\%$). Mean responses from each case are shown in Table 23.

Table 23
Descriptive statistics of students' perceptions on how the programmes motivate them

Item no	Item	IGCSE <i>M (SD)</i>	MoNEP <i>M (SD)</i>	IBMYP <i>M (SD)</i>
1	prefer challenging course materials	5.12 (1.29)	4.98 (1.37)	5.07 (1.39)
2	use what's learnt in other courses	5.20 (1.38)	5.58 (1.20)	5.16 (1.34)
3	can understand most difficult material	5.28 (1.46)	4.44 (1.75)	4.63 (1.65)
4	prefer material which arouses curiosity	5.62 (1.30)	5.93 (1.13)	5.19 (1.55)
5	confident to do excellent job	5.17 (1.33)	4.67 (1.51)	4.53 (1.54)
6	course materials are useful to learn	5.20 (1.48)	5.23 (1.52)	4.97 (1.57)
7	prefer materials which help learning	4.27 (1.65)	4.70 (1.90)	4.52 (1.87)
8	like subject matters in courses	4.93 (1.55)	5.00 (1.58)	4.70 (1.68)
9	certain that he can master skills	5.50 (1.31)	5.19 (1.61)	5.07 (1.48)

The questionnaire results showed that a high proportion of the students surveyed, ($N_{\text{MoNEP}}=43$, 86%, $N_{\text{IGCSE}}=51$, 73%, and $N_{\text{MYYP}}=121$, 72%) agreed that they will be able to employ what they learn in one course to other courses. This implies that if they are provided with more opportunities to apply their knowledge and skills into different and new situations, they will be more motivated to learn.

The first sub-question of the third research question asked if there are any significant differences among the responses of MoNEP, IGCSE and IBMYP towards motivation for learning. A one-way ANOVA was conducted to compare the means scores of three cases on motivation towards learning. According to the one-way ANOVA results, the null hypothesis was accepted due to finding not significant differences ($F(2, 201)=.125$, $p=.883$) between the mean motivation scores of MoNEP ($M=5.06$, $SD=.85$), IGCSE ($M=5.14$, $SD=.98$), and IBMYP ($M=4.90$, $SD=1.17$). The observed power was .241 which indicates a larger sample size may be needed for statistical significance.

The questionnaire results revealed that students from all three programmes have positive attitudes towards learning according to their responses to the questionnaire. Many of the respondents ($N_{\text{MoNEP}}=43$, 65%, $N_{\text{IGCSE}}=59$, 76%, and $N_{\text{MYYP}}=121$, 74%) agreed that they prefer course materials that challenge them so they can learn new things. Furthermore, a considerably high proportion of the respondents ($N_{\text{MoNEP}}=43$, 72%, $N_{\text{IGCSE}}=60$, 77%, and $N_{\text{MYYP}}=118$, 62%) agreed that the course materials in their classes are useful for learning. Importantly, the majority of the respondents ($N_{\text{MoNEP}}=41$, 90%, $N_{\text{IGCSE}}=60$, 83%, and $N_{\text{MYYP}}=120$, 75%) agreed that they prefer

course materials that arouse their curiosity, even if it is difficult to learn. Mean responses from each case are shown in Table 24.

Table 24
Descriptive statistics of students' perceptions on how the programmes had impacted on their attitudes

Item no	Item	IGCSE <i>M (SD)</i>	MoNEP <i>M (SD)</i>	IBMYP <i>M (SD)</i>
1	important to learn new concepts	4.25 (0.81)	4.48 (0.71)	4.08 (0.91)
2	not produce excuses for incomplete homework	3.02 (1.20)	2.81 (1.30)	2.82 (1.27)
3	not looking for reasons to keep them from studying	3.84 (1.21)	3.65 (1.33)	3.47 (1.29)
4	having goal of learning as much as they can	4.02 (0.89)	4.33 (0.84)	4.06 (0.97)
5	having goal of mastering new skills	4.25 (0.84)	4.50 (0.63)	4.20 (0.89)
6	important to understand class work	4.42 (0.67)	4.58 (0.70)	4.49 (0.79)
7	even the work is hard they can learn	4.23 (0.74)	4.00 (0.93)	4.00 (1.00)

The second sub-question of the third research question explored significant differences among case study student responses regarding their attitudes towards learning. A one-way ANOVA was conducted to compare the means scores of three cases on attitudes towards learning. According to the one-way ANOVA results, the null hypothesis was accepted due to finding no significant differences

($F(2, 207) = .961, p = .384$) between the mean attitude scores of MoNEP ($M=4.04, SD=.45$), IGCSE ($M=3.10, SD=.58$), and IBMYP ($M=3.91, SD=.57$). The observed power was .215 which indicates a larger sample size may be needed for statistical significance.

Qualitative results for research question 3: Dispositions

The qualitative data analysis provided insights into “how” the students perceived that the programmes developed skills in their learning strategies and dispositions.

Furthermore, the focus groups provided insights into students’ perceptions of how the programmes influenced their motivational levels towards learning and improved their self-regulation.

Students believe that the MoNEP, the IGCSE, and the IBMYP motivate them to learn. Data to support this finding came from responses to the questionnaire and the focus group interview questions. In particular, they expressed confidence that the programme would prepare them for the IBDP. During focus group interviews, the students in grades 11 and 12 concurred and added that they were motivated to apply skills learning in their pre-IBDP classes because they were important for succeeding in upper high school. Students shared that learning these skills improved their confidence and motivated them to learn in the IBDP. One grade 10 student shared, “We are not only learning how to answer the questions but also to understand what is being asked in the question. This will help me in IBDP.” Two grade 10 students also reported:

I think the exam style of IGCSE is very similar to the IBDP. I was not studying my exams like this when I was in a different

school which was not offering any supportive programme to MoNEP. I was only solving some questions but now in this school I also use my textbook to study.

Some of the questions we answer in our IGCSE English language and literature course are open-ended. There is no correct answer or wrong answer, the most important thing is to see how we express and justify our thoughts. This is the same in IBDP so I think this will help us.

Grade 11 students think that the IGCSE was helpful to prepare them for IBDP because they learned background knowledge which they needed in IBDP. As they already passed their IGCSE exams they reported that the IGCSE exam style is very similar to the IBDP exam style. One grade 11 student shared, “The curriculum is also similar but the depth is not even close to each other.”

As they remember how hard they studied for the IGCSE exams, grade 11 students reported that they developed a different skill which is to be able to answer the exam questions according to the marking scheme. It is very interesting that the students considered this as a skill important to pass the exams. This may have been interpreted as a skill of reading and understanding the questions in a better way.

Students also reported that they found a close relationship between science and mathematics courses therefore they must have used some skills that they learned in both courses, even though they do not clearly remember. They referred back to their English language and literature course which helped them to improve their writing skills, analysis skills, and presentation skills. One grade 11 student shared, “I might have used the skills I improved in my English language and literature course compared to Turkish language and literature course because we used to do more

activities in English compared to Turkish. I think I used the same techniques to be able to understand the text and analyse what the author said in Turkish.” Another grade 11 student added, “I think the Individual Oral Presentations we have in IBDP are very similar to those in IGCSE. We used to do at least one presentation in each semester when we were in IGCSE.”

Grade 12 students reported the similarity between English and Turkish language and literature courses which helped them use similar knowledge and skills in both of these courses. One of them shared, “I do not think that anybody can provide a particular example since physics and mathematics already share common and basic knowledge. We cannot claim that due to the IGCSE we managed to use certain skills in some lessons.”

Another learning motivator for students is if they realize they can transfer what they study in one class to another or to their lives (Ormrod, 2006). One of the grade 12 IBDP students from Case IBMYP stated, “You may not recognize the interdisciplinary link in IBMYP; however, I know that in science and history courses I used the discussion skills I developed in the English language and literature course. Also, I remember that we were using our scientific and historical knowledge when we were writing our arguments in the literature course. This was how we link the courses with each other.” Grade 12 IBMYP graduates told that they improved their discussion skills in literature courses and then they used these skills in science and history courses.

Grade 12 MoNEP students shared their thoughts from a different perspective and

they said that pre-IBDP does not have a particularly planned interdisciplinary approach. They said that this is just the English version of the national curriculum. One student clearly stated, “Pre-IBDP is only the English version of what other students in the national programme study. So whatever a student who studies the national curriculum finds in common with physics and chemistry, that is also what we found in common, too. So there is no particular interdisciplinary approach.”

The current and former MoNEP students did not recall courses that were purposefully interdisciplinary. One of the grade 12 IBDP students stated:

Although we were in a preparatory course for IBDP, the only change was that it was taught in English. Other than this, we didn't see any relation to other subject areas.

Another motivating factor for student learning was gaining experience studying for tests; this was useful preparation for taking the IBDP examinations. To succeed in these exams, students need to be capable of working independently and monitor their own progress. It was mainly students from Case IGSCSE who reflected on how hard they studied for exams. Grade 11 students reported that they developed a different skill which is to be able to answer the exam questions according to the mark scheme of past exam questions. Corlu (2014) posits that preparing for IGCSE exams may be helpful for future IBDP students because of the similar structure of the exams. The ACER study (2015) confirmed that memorization and summarizing skills used in preparation for the IGCSE can be applied to test-taking in the IBDP. Due to the summative exam at the end of the two-year IGCSE, students reported that they developed note-taking skills. They developed these skills because they realized simply reading textbooks was not sufficient for learning the information. This reveals

how students developed a strategy to overcome a challenge. Neither MoNEP nor IBMYP students have summative examinations in their programmes that are similar to the IBDP exam.

Students think that learning in English is preparing the students for the IBDP. They also see the IBMYP as a preparation programme because it improves students' time management skills. Students believe that their writing skills would not improve so much without the IBMYP. One grade 11 student shared, "We did not have a choice since IBMYP is offered by our school. IBMYP prepared us for IBDP in a mental way. We learned how to inquire and how to conduct a research. However, this programme still has some imperfections. I cannot say that it perfectly prepared me for the IBDP."

IGCSE students think that IGCSE will help them in IBDP because they improved their time management skills and also they took exams which are very similar in structure to IBDP exams. Grade 10 students reported that they learned how to be more organized by the help of the IGCSE. This will help them in IBDP since they need highly developed time management skills in IBDP. They also think that they learned how to read and understand the exam questions which will help them in the IBDP.

The study revealed that support materials and other learning experiences students gained during their pre-IBDP coursework were motivations for learning. Some students may be more motivated when they are challenged by the learning

experiences (Gross, 1993). Therefore the students' perceptions on the course materials will affect their motivation towards learning.

During the focus group interviews, participants were given a list of course materials and asked which motivated them to learn (Table 25). Hands-on materials, such as lab work and interactive videos were the most popular. Students also indicated that research peaks their curiosity. Interestingly, none of the MoNEP students and only two of the IBMYP students found the worksheets prepared by the teachers motivating. Just one MoNEP student reported that the textbooks they used in the lessons were intriguing, whereas none of the IBMYP students agreed. Only six MoNEP and four IBMYP students reported the term project enhanced their desire to conduct research. However eight IBMYP students reported the personal project, which is required component of IBMYP (IBO, 2014), enhanced their curiosity and desire to do research.

Table 25
List of course materials that motivate students to learn

	IGCSE (N=20)	IBMYP (N=17)	MoNEP (N=16)
Lab experiments	19	11	12
Interactive videos	11	14	9
Research assignments	10	7	10
Audio-visual materials	8	9	9
Article/magazine/newspaper	4	6	5
Personal	4	5	8
Projects/competition projects			
Reading-writing tasks	3	3	9
Social service projects	2	5	8
Worksheets/workbooks	6	0	2
Term projects	0	6	4
Textbooks	8	1	0
Use of tablet applications	1	2	5
Use of smart board	2	0	5

In addition to motivation, students' attitudes towards learning are considered as a factor that has an impact on their dispositions. The questionnaire results discussed in the previous section also provide insights about some differences among the three cases as far as motivation. One significant difference was that the MoNEP students valued learning new concepts. Perhaps they perceive the extra content knowledge will better prepare them for the rigors of the IBDP.

The IBO (2015) considers affective skills (dispositions) important for motivating students and helping them overcome academic challenges. Importantly, classroom environments are known to increase students' intrinsic motivation as well as their self-efficacy (Deci, 1975). As Pintrich and De Groot (1990) reported, self-efficacy correlates with self-regulation and use of effective learning strategies. In other words, providing students with skills such as writing, research, and studying gives them confidence that can motivate them to learn, as also reported by McCoach and Siegle (2003).

Results for research question 4: Critical thinking skills

Students described critical thinking during the focus group interviews. They also shared their perceptions on how certain learning activities within each programme helped them develop their critical thinking skills. They described how some activities they went through supported them to improve their critical thinking skills.

Student perceptions of IGCSE contributions to the development of their critical thinking skills

During the focus group interviews, IGCSE students described themselves as critical thinkers because they said that they think deeply about issues and carefully analyse situations they encounter. In particular, students said that the books they read and the activities they completed in English and Turkish language and literature courses opened their minds to different ways of thinking. One reason students may have credited their language classes with fostering critical thinking is that the courses aim to improve students reading, writing, speaking, and listening skills so that they can become effective communicators. With the help of the texts they study in the course, students are expected to develop an understanding of what they read, to develop their critical thinking skills and to acquire reading habits (MEB, 2018).

One Grade 10 student shared, “In Turkish and English language and literature courses we used to write poems. When we discussed about each other’s comments and wrote compositions about our thoughts, we were required to think critically.” The students explained that the poems and the compositions they wrote in the literature course provided them with the opportunity to discuss each other’s comments. During the discussions they said that they were provided with opportunities to share their first impressions of the writings and to ask each other questions. They were encouraged to listen to different opinions and rationalizations. Most importantly, the teacher facilitated and encouraged students to work together to draw conclusions that were constructed from the class conversations and revelations.

Students especially praised their Turkish Language and Literature courses for advancing their thinking skills. An advantage of their Turkish Language and

Literature classes, in particular, is that they are given opportunities to have deep, interactive discussions in their native language. This experience builds a foundation and confidence for when they will be expected to debate and argue in English as IB DP students. In fact, a few students reflected that their Turkish language classes were more rigorous than their English course. As a grade 11 student noted, “We used to have discussion sessions on the books we read in Turkish language and literature but we did not have many discussions in our English language and literature course.”

Langer’s study (1995) also supports that students benefit from hearing alternative interpretations of written work from their peers. He found, however, that with rare exceptions – such as debates in social studies classes – different interpretations are not expected from the students. Even the debate setting only allowed for two opposing viewpoints rather than a myriad of perspectives. He observed the same thing in science lessons where teachers use more reference-based knowledge and gave students few opportunities to explore different possibilities for the outcomes of an experiment.

IGCSE students noted that their science classes also helped develop their cognitive capacity. They commented that the interdisciplinary nature of some of their courses – which integrate physics, biology, and chemistry – helped them to make connections among science topics and to better relate their learning to the real world. They learn to critically analyse scientific developments, identifying how societies and the environment have both benefitted and been harmed by some of the innovations. These classes relate theory and scientific thinking to help students develop inquiry skills needed to conduct their own investigations.

A major assessment in IGCSE science courses is either to complete a laboratory experiment or to write an examination paper thoroughly explaining how they would conduct a practical. Case IGCSE opted to give students the exam paper and to assess their familiarity with laboratory practical procedures. Students discussed how meeting the criteria of this examination helped them develop scientific skills and to be able to accurately explain how they conduct experiments. The questions in Paper 6 (alternative to practical examination paper) are set for candidates to:

- Describe simply how they would conduct an experimental procedure
- Follow instructions for drawing, completing, labelling diagrams
- Take readings from diagrams and graphs
- Process data to complete data tables
- Present processed data on a graph
- Draw conclusion and results of an experiment
- Identify appropriate apparatus to conduct an experiment
- Explain and suggest safety issues and precautions for possible improvements in methodology (CAIE, 2014).

Not all the students thought that it was their IGCSE experience that developed their critical thinking skills, however. They basically thought this was something that would develop with age. They even referenced Piaget and his cognitive developmental levels, explaining that as they mature they become more abstract thinkers. As one grade 10 student said,

I think this is a skill which develops through the years. It would not matter whether we study IGCSE or we study at a different school, through the years as our reading skills improve our critical thinking skills would also develop since we would pursue more knowledge.

During the focus group, a couple of the grade 12 IBDP students said that credit also had to be given to their PYP experience and their families and were hesitant to attribute much of their advanced thinking skills to a two-year IGCSE programme. It is possible that positive memories of PYP and current participation in the IBDP leads them to value the role of the IB experience in their lives more than their limited experience with IGCSE. One grade 12 student went so far as to indicate that their IGCSE courses limited their independent thinking:

Even in IGCSE language and literature courses we are expected to write in a certain way. We were not independent enough to write our own thoughts freely in the exams. Because of this, I do not think that IGCSE helped us to improve our critical thinking skills. Especially when I recognize the differences between IBDP and IGCSE I can clearly see how a programme should have prepared us to think critically.

Moreover, they recognize that the school itself, with its extracurricular activities, culture, and profile has an influence that may be stronger than their IGCSE courses.

As one student wisely noted:

The PYP, IGCSE and our teachers were all the factors which helped us to develop these kind of skills. Teachers are one of the major factors which help us improve our critical thinking skills because in some lessons we do lots of activities which require us to think analytically. Therefore, I think critical thinking is a skill which is developed as a result of a combination of all these different factors through the years.

Student perceptions of MoNEP contributions to the development of their critical thinking skills

In the focus group interviews MoNEP students described themselves as critical thinkers because they consider themselves as questioning different ideas and trying

to look at the issues from different perspectives. Grade 12 students also reported that they are critical thinkers because they evaluate the information provided from different perspectives. One grade 10 student supported these IBDP students, “I question the ideas, ideologies and what people say. This is the reason that I believe I am a critical thinker. I think critical thinking is the ability to see the things in different perspectives.”

Grade 10 students also reported similarly to IGCSE students on the benefits of literature courses. They revealed that they were writing critical essays in English and Turkish language and literature courses which helped them to improve their critical thinking skills because they evaluated both positive and negative thoughts. When the document analysis was done on two sample MoNEP projects completed in the end of grade 10, it was seen that students’ critical thinking skill was at an acceptable level. The samples were evaluated in the aspects of interpretation of evidence, argumentation, analyses of arguments, explanation of conclusions and open-mindedness. Both sample literature projects were about a book analysis. Although the students seem to be able to analyse the characters in the book they still needed to use more support from the literature for a better and reliable analysis. They have an understanding of argumentation and they can produce arguments however they usually consider only one perspective in their analysis. For an evidence of critical thinking there should be consideration of at least two different perspectives so that we can see their understanding of different points of view. Following this weakness their conclusion was also weak since they have a quick conclusion without showing an understanding of how the book analysis they did can have implications in real life.

Grade 12 students also agreed on the benefits of literature courses to improve their critical thinking skills. They referred back to the book analysis presentations they made in Turkish language and literature courses. The presentations they prepare on their own analysis of the books they read and the discussion sessions held after reading the books in class was helpful to improve their critical thinking skills. They also told that their English language and literature courses were very similar to TOK in the IBDP since they do a lot of inquiry during the lesson. As supported in the literature, in-depth questioning of the existing data and sources provide students with the chance of understanding how to find reliable information, therefore enhances the critical thinking skills (McCollister & Saylor, 2010). Different than grade 10 students, 12th graders also reported that explaining all the scientific rules and theories in science courses also helped them use their critical thinking skills. One grade 12 student shared, “Our English language and literature lessons were similar to Theory of Knowledge lessons since we used to do lot of inquiry.”

Student perceptions of IBMYP contributions to the development of their critical thinking skills

IBMYP students also reported very similar comments on why they consider themselves as critical thinkers. They think that writing lab reports has improved their critical thinking skills. They also consider writing the conclusion and evaluation parts of the lab reports as a supporting activity to allow them to think critically. One grade 10 student stated:

I think there is no single truth and truth changes from person to person based on their own perspectives. Therefore, I consider critical thinking as providing the opposite point of view. I agree with my friend on saying that there is no single truth. I always wonder the reasons of everything.

While they write lab reports and they evaluate their results, they need to think critically. One grade 12 student shared:

When we started the IBDP, lab reports were one of the things that we were familiar with. We learned how to think critically with the help of the lab reports we wrote. IBMYP was more focused on process whereas the MoNEP was more focused on the product. Our aim was never to prove the information which is already available on the internet but to evaluate the results we obtained. It was never important for my teachers how awkward my results were in the end of the experiment. The most important thing was for me to see how I evaluated the process to see my mistakes.

Grade 12 students reported that they investigate reasons of problems and evaluate critically to solve the problems. They agreed that there is a connection between critical thinking and reflective thinking. As their reflective thinking process improves, their critical thinking skills also improve. Two grade 10 students said:

Critical thinking is to be able to see the situation from different perspectives rather than accepting without questioning. In my lab reports I try to defend my results. Even though the results turn out to be different than my expectations I try to explain why I got this result and I evaluate what might have gone wrong.

We are writing conclusion and evaluation parts in our lab reports. In the evaluation part, we think about possible mistakes we might have done to justify our results. This is also helping us to improve our critical thinking skills.

IBMYP students also agreed with the IGCSE and MoNEP students about the support of literature and science courses to improve their critical thinking skills. Grade 10 IBMYP students told that interpretations they made about the books they read in their literature course helped them to think critically.

As also supported by the literature, in the report on critical thinking and literature-

based reading by the Institute for Academic Excellence (1997), reading is characterized as a thought-provoking experience to the readers. During the reading process, they will also develop critical thinking since the readers construct meaning from the texts tries. While reading a literature text or a book, the reader recognizes the patterns and tries to fit the details into these patterns and relate those with his/her own experiences. This is where the critical thinking skills of readers are involved. Two other studies in 1996 and 1997 from the Institute for Academic Excellence (as cited above), showed that among approximately 6000 schools, the ones which own “Accelerated Reader” did significantly better on standardized tests measuring critical thinking. They saw that students improved their reading, writing, mathematics and social studies scores which meant that the critical thinking developed by the literature-based reading can also be transferrable to other courses. Reading books help them enhance knowledge and their understanding of intercultural differences as well as providing them different point of views. Therefore, as students recognized, reading books and analysing the texts in these books help the students to develop critical thinking skills. One of the IBMYP students shared his or her perspective below:

We support our general culture and vocabulary by reading books. All of us interpret the books in a different way. Although the topic, main idea and the theme are the same, each of us have different point of views.

IBMYP graduate grade 12 students also talked about the support of interactive presentations they delivered in their English language and literature course. They also noted that the explanations of mathematical proofs helped them to think critically instead of only memorizing the information. One grade 12 IBMYP graduate shared:

I think the most important one is the interactive presentations we made. The presentations we made in our English language and literature course were helpful because after each presentation we held a discussion to support our thoughts on why we agree or disagree with our friends. In mathematics it was also the same. Our teachers never told us to accept anything without questioning. They always explained us the starting point of everything.

Students' perspectives are aligned with the IBMYP's aims of the personal project.

The IBMYP personal project is completed by the students at the end of grade 10 which is at the same time with the term projects completed in IGCSE and MoNEP schools. The personal project aims for students to improve their ATL skills for communication, critical and creative thinking, research, self-management and collaboration. This project differs from MoNEP term projects in the aspects of setting clear and common criteria for assessment and a common process of producing the project components. The personal project must be relevant to the global contexts established in the IBMYP framework to direct learning towards independent inquiry (IBO, 2014). To achieve independent inquiry, the project components consist of the process, product or outcome and the report or presentation in which the student explains what he or she did and learned throughout the project.

Another considerable difference which may cause students to think that IBMYP helped them develop critical thinking skills is that they have to document their thinking in a process journal. This learning strategy helped them to reflect upon their own learning and progress. One grade 11 student shared, "In the beginning of each unit, our teachers write an inquiry question and in the end of the unit we question it. This might also be helpful." This is further demonstrated below whereby a grade 12 IBMYP graduate reported in his/her focus group interview:

The definition would change from person to person. I believe I am a critical thinker because I investigate the reasons of the problem. When I finish a project, I sit and think how I would make that in a better way. I also have the habit of questioning how even a formula is produced.

Similar to the reflection that the students make when they are completing the personal project (in which they reflect on how they extended their knowledge and understanding), they were also provided with the chance of reflecting on what they have learned in individual courses. This reflection at the end of each unit, is led by the inquiry statements written by the teachers in their unit plans. This requirement of IBMYP helps teachers to plan inquiry-based lessons if they give up traditional lesson plans (Ateşkan et al., 2016). One grade 11 student shared:

In the end of each unit, teachers are giving us a sheet for us to reflect on what we learned and which skills we developed. It is helpful for us to do self-reflection. But they do this since this is a requirement.

Grade 11 students gave an example of a compare and contrast essay they wrote in their English language and literature course along with the persuasive essays they wrote. They also mentioned the importance of inquiry questions provided to them at the beginning of each unit in every course. They noted that these inquiry statements were written by their teachers and they were questioned on them throughout the unit. This helped them use their critical thinking skills. However they were concerned with the speed at which they were pressured to complete them at the end of grade 10. They told that these essays were assigned through the end of the grade 10 just to address the requirement of the programme. The teachers had also reported similar challenges during the implementation of the IBMYP in Turkey.

One of the strategies to overcome these challenges of catching up with the curriculum during an academic year is reported by teachers as combining the IBMYP requirements with MoNE requirements. For instance the personal project requirement of the IBMYP is also considered and counted as addressing the term project requirement of MoNEP so that the students do not have two separate projects to complete (Ateşkan et al., 2016). Unfortunately, while the teachers are trying to follow the curriculum within the IBMYP framework, it is also possible to lose the focus on skill development. One grade 12 student shared:

When we were in the 10th grade we wrote lots of essays. Those essays were required to be done throughout the IBMYP not only in the end of the programme. However, we wrote all of these in the very last weeks.

Indications of students' critical thinking skills exhibited in their major projects

The raters used the Holistic Critical Thinking Scoring rubric (Appendix C) which was developed by Facione & Facione (2009) to evaluate the students use of critical thinking skills in their projects. The scores of each rater and the agreement level are shown in Table 26.

Table 26
Rater's score table on students' projects

Case	Subject area	Project title	Rater 1	Rater 2	Agreement
IGCSE	Chemistry	Acid rain pollution	1	1	1
IGCSE	Chemistry	Ozone layer depletion and its effects	1	1	1
IGCSE	English literature	Shakespeare neuroscience	2	2	1
IBMYP	Interdisciplinary	Depoliticization of Turkey: 12th September	2	2	1
IBMYP	Interdisciplinary	Shakespeare and the renaissance	2	1	0
IBMYP	Literature	The giver	2	2	1
MONEP	Biology	Petroleum refinery waste and effects on organisms	1	1	1

Table 26 (cont'd)
 Rater's score table on students' projects

MONEP	Literature	Lord of the flies – passage analysis	2	1	0
MONEP	Literature	The introduction to evilness, wildness and savagery	2	1	0

3 rated strongly for critical thinking skills in the criteria
 2: rated acceptable for critical thinking skills in the criteria
 1: rated weak for critical thinking skills in the criteria

Additional insights into pre-IBDP preparation from all three cases

All of the three programmes studied in this particular study were found to prepare students for the IBDP. Each programme helps students develop their learning strategies (metacognitive skills and self-regulated learning) and dispositions (attitudes and motivation towards learning) in support of their critical thinking skills as discussed in previous chapters. These programmes are not created in order to prepare students for the IBDP, consequently each can be considered as stand-alone programmes.

Case IBMYP insights

IBMYP students agreed that the IBMYP is helping them to improve their writing skills, presentation skills, and research skills. Although they feel comfortable to express their ideas, they still would like to have more opportunities to improve their writing skills. Particularly they would like to have more writing activities in other courses except the literature courses since they believe this is necessary for them to write lab reports and the Extended Essay in the IBDP. IBMYP students also would like to have:

- more creativity, action and service activities to do meaningful extracurricular activities
- more field trips for place-based learning
- more rigorous work with strict deadlines
- mathematics exploration similar to IBDP mathematics exploration
- similar approach to TOK course to improve their critical thinking skills
- more course options similar to IBDP

Case IGCSE insights

All of the students agreed that the most useful part of the IGCSE is its similar exam structure with the IBDP. Students also reported some minor issues to be re-considered in the IGCSE. If the authorities would like IGCSE to be considered and preferred by the schools as an alternative preparatory programme for IBDP, they should improve the curriculum in light of preparing the students with more clearly set goals in alignment with the sustainable development goals. Students would like to:

- select their own courses which they will also consider taking in IBDP such as Economics and Psychology. When the schools choose an appropriate curriculum but forsake some other factors, such as the school success in international arena, the students might not see the purpose of taking a particular course. For instance, the Case IGCSE students in this study were confused about taking an integrated science course throughout their two-year IGCSE education because, in the end, they were asked to write separate science examination papers in the IGCSE exam.

- take appropriate level of difficulty for each course to prepare better for the rigour of IBDP courses.
- write essays and research papers such as exploratory lab reports to prepare themselves for the Extended Essay component of IBDP.

The desires of students highlighted above, can show us their perspectives on the rigour of IBDP components such as the Extended Essay. The focus group interview questions revealed more of their perceptions as to why they feel they are unprepared for some components of the IBDP at a similar level of difficulty.

Case MoNEP insights

Students from this case reported that their pre-IBDP years helped the students to learn terminology in the English language. When their pre-IBDP course used a comparable curriculum format to the IBDP in literature and science courses, the students developed required skills. For instance, students found it beneficial to learn how to write essays and how to do an analysis. Students particularly reported that the literature course is different from the national curriculum literature course since they do book analysis, which is helpful to prepare them for making analysis in the IBDP.

They also emphasized the importance of familiarizing themselves with the IB-style exam questions since the national curriculum has a very different way of asking questions in the national examinations. For instance, in MoNEP examinations there is no requirement to use *Ti*-calculator. They reported that particularly they are learning how to use *Ti*-calculator in mathematics which they will use in the IBDP and they answer past exam questions in this lesson.

Regarding recommendations from improving their pre-IBDP years, Case MoNEP students would like to carry on their preparation for the national examination and the IBDP preparation at the same time. Addressing only the national requirements also forces students and teachers to change the teaching and learning strategies that are not suitable for the IBDP. Students request that the programme should focus on developing students' structural writing skills. Finally, the students recommend that the MoNEP should be revised to include more components similar to IBDP requirements to improve students' particular skills.

Conclusion

The findings of this study show that the IGCSE, IBMYP and MoNEP prepare students for the IBDP. From the students' perspectives in all cases, they have developed learning strategies and dispositions to some extent. These are considered to prepare them not only for an academically challenging international programme, the IBDP, but also for the future. This study focused only on certain skills and dispositions: self-regulation, metacognition, attitudes and motivation toward learning, and critical thinking. All of these have also been found to have a connection with the 21st century skills. Therefore, referring to the theoretical framework of this study, by developing these skills and dispositions students in IGCSE, IBMYP and MoNEP were considered to be better prepared for contributing to a sustainable future. Further discussion of these findings is presented in the final chapter.

CHAPTER 5: DISCUSSION

Introduction

This final chapter begins with an overview of the dissertation to review the aim of the study, the research context and the methodology. Next, the overall findings and their considerations are discussed, followed by the major findings in relation to the research. The findings are presented with the support of a related literature review. After the findings are discussed, the implications of this study for practice and research are presented. Finally, the limitations of the study are explained.

Overview of the study

This study investigated how Turkish high school students from three different programmes perceived how they were prepared for the IBDP. This preparation also provides students with important 21st century skills that they will need to contribute to a sustainable future. The study focused on how students perceived their learning strategies (self-regulation and metacognition) and their dispositions (motivation, attitudes towards learning) were developed. Students were also asked about perceptions of their critical thinking, which was further investigated by examining samples of their work.

The need for quality education in the Turkish national education system has been reported in the Development Agenda of Turkey for Post-2015 National Consultation Report (United Nations Development Group, 2013). To meet this need, a number of

schools in Turkey implement an international programme, the IBDP. The IBDP is known to promote the outcomes of international education, such as, international mindedness in support of 21st century skills (Singh & Qi, 2013). This current study presents the argument that the IBDP prepares students for more than their university entrance, it also builds their capacity to contribute to a sustainable future. Therefore, the framework of this study was produced in light of the selected common attributes that the IBDP provides relevant to 21st century skills. The forms of support that the students reference can be integrated to a national curriculum and help prepare students for their upper high school years and their future.

In this comparative case study, mixed research methods were used to investigate three education programmes for lower high school (grades 9 and 10) that were implemented in the three case study schools. Quantitative and qualitative data were analysed to gain a variety of insights into students' perceptions. The quantitative data was composed of the students' responses to the questionnaires where they shared perceptions about their self-regulation, metacognition, motivation and attitudes towards learning. The qualitative data came from focus groups and the document analysis of the students' principal assignment. The evaluation of this assignment was used to learn how students applied their critical thinking skills.

The students reported that the experiences (coursework, projects, extracurricular activities) they received in grades 9 and 10 were helpful in preparation for the IBDP. One skill in particular that was of interest for the current study was the development of students' critical thinking, which is also an important 21st century skill. In fact, many of the skills that students reported and were developed in their pre-IBDP

programmes were found to complement the skills students need to contribute to a sustainable future.

Overall findings and considerations

This study began with the intention of learning how students are prepared for the IBDP. The researcher had concerns that her students lacked the necessary skills to meet the demands of a rigorous international education programme. Succeeding in the IBDP is important because it not only prepares students for university, but it also helps develop skills and ways of thinking that will be important throughout their lives. These skills include critical thinking and effective communication that will enable students to make thoughtful decisions and to think carefully and wisely. To learn how students were developing these skills, the researcher compared three different approaches for IBDP preparation: MoNEP, IGCSE, and IBMYP.

The intention of the study was not to determine which programme was best, and indeed, the findings reveal that students from all three case study schools perceive their pre-IBDP programmes to be effective. Therefore, this study makes no claim that one programme is better than the other to prepare students for the IBDP. The programmes are all helping students to prepare themselves for the IBDP as well as for their future (Table 27).

Students from all three cases appreciated that in the IBDP they were encouraged to take more responsibility for their learning. They indicated that when they are challenged and they succeed, they become more motivated and their attitude towards

learning improves. Therefore, they valued opportunities during their pre-IBDP years to gain experience and build their confidence. Students from each case provided different experiences that prepared them for IBDP and they also identified skills they wish were further strengthened.

IBMYP students shared a variety of experiences that contributed to their critical thinking skills, especially writing essays and preparing lab reports. They emphasized the importance of the personal project component of IBMYP; this project has specified assessment criteria and is moderated by an international examiner. Successfully completing this project builds students' skills in research, collaboration, inquiry, and reflection (IBO, 2014).

Neither IGCSE nor MoNEP expects students to complete a project of this calibre. On the other hand, these students did express more confidence in preparing for exams than the IBMYP students. Other studies have found that IBMYP students express concern about IBDP exams (ACER, 2018). Among the case study schools, the IGCSE students especially indicated that they received more extensive exam preparation and were able to describe skills related to self-regulated learning and metacognition. They provide examples of how they learned to manage their time, developed regular study habits, and honed their exam-taking skills.

While gaining skills to perform well on exams has its benefits, the MoNEP students were vocal about the shortcomings of having lessons that were so test-focused. They were critical of traditional teaching strategies they experienced. Rather than encouraging students to become independent thinkers and construct their own

knowledge, they were encouraged to memorize facts and figures. Responses on the questionnaire and during focus group interviews verified that MoNEP valued using a variety of resources and materials to spark their interest and arouse their curiosity.

Table 27
Summary of the key findings

Aspects of the study/cases	IGCSE	IBMYP	MoNEP
Learning strategies: (data source: questionnaires and focus group interviews)	<ul style="list-style-type: none"> • Feel ready for IBDP • Support of literature courses • Essay writing, data analysis, lab report writing, presentation and communication skills • Test preparation • More regular study habits 	<ul style="list-style-type: none"> • Feel ready for IBDP • Support of literature courses • Essay writing, data analysis, lab report writing, presentation and communication, research and reflection skills 	<ul style="list-style-type: none"> • Feel ready for IBDP • Support of literature courses • Essay writing, data analysis, lab report writing, presentation and communication skills • Test preparation • Less regular study habits
Dispositions: (data source: questionnaires and focus group interviews)	<ul style="list-style-type: none"> • Feel more confident for IBDP • Exam-oriented • IB similar literature courses • Shallow math and science curriculum • No opportunity for advanced research • Feel more certain of their abilities 	<ul style="list-style-type: none"> • Feel confident for IBDP • Concerned about IB exams • Less motivated to learn new concepts 	<ul style="list-style-type: none"> • Less motivated and less confident for IBDP • No particular focus on skill development • Feel less certain on their abilities • More motivated to learn new concepts
Critical thinking skills (data source: projects & focus group interviews)	Needs to be improved	Acceptable level	Mostly weak level

When attempting to discern how a programme might contribute to the development of the students' skills and dispositions, it is important to consider the student themselves. Although they experienced three different programmes, they share many of the same qualities, experiences, and upbringings:

Firstly, students from all three cases are Turkish and are receiving an education from the Ministry of National Education, even if they participate in an additional international programme. As noted several times in this study, the national curriculum is more teacher-centred and encourages rote learning, especially when preparing for university entrance exams and other forms of high stakes testing. Moreover, the ministry's curriculum is known to change suddenly and drastically. Perhaps the IGCSE and IBMYP provide more stability since the curriculum changes are planned and introduced more regularly. The curriculum review process for IBO programmes occurs about every five years and the updates for the IGCSE curriculum are always announced at least two years before the schools start to implement the curriculum.

Secondly, they are all attending private, prestigious schools, located in large cities, which gives an indication into the students' socio-economic status. Most of them have well-educated parents who can afford to send them to expensive private schools.

This situation leads to the third consideration, which is related to the Rosenthal effect also known as the Pygmalion effect (Rosenthal & Jacobson, 1968). This effect explains how the high expectations of a person can influence his or her behaviour.

Students might perform well, no matter which preparation programme they are in, because stakeholders – parents, teachers, administration – expect them to. They expect this because of the large amount of resources that are invested in the students, including tuition fees, teaching time, resources, and other expenses. They are also competitive; they take only the top students and if students perform well, their entry into a top quality university is more likely. With this belief imposed on the students, they might indeed show enhanced performance.

Finally, even though the researcher limited the investigation of preparation programmes to grades 9 and 10, it cannot be ignored that the IBMYP is a five-year programme. Therefore, the IBMYP students could have had more time, starting from grade 5 to develop learning strategies and dispositions, whereas the Case IGCSE and Case MoNEP students were only exposed to these advanced learning strategies for two years in lower high school.

Furthermore, many of the students – those from both Case IBMYP and Case IGCSE – had experienced the IBPYP which was also reported to support their learning skills. As an IB programme, IBPYP is also helping students to experience the IB's consistent educational philosophy and to develop IB learner profile attributes. IBPYP is offered to any student between the ages of 3 and 12 and is offered as a preparatory programme for the IBMYP. The programme aims to increase students' confidence, self-motivation while developing their skills, knowledge and attitudes with its inquiry-led, transdisciplinary framework. Since the IBPYP encourages learning through inquiry, students are also learning to think for themselves and take responsibility for their own learning (IBO, 2018c). Being inquisitive complements

critical thinking as it involves questioning and being attentive to facts and details. Early inquiry-based experiences gained through the IBPYP might have long-term benefits that could influence the development of students' critical thinking skills and other attributes of the IB learner profile. Some of the Case IGCSE students in particular credited their IBPYP experience to the development of critical thinking skills. McPeck (1981) points out that critical thinking skills need to be grounded in the subject area curriculum and students need real-life problems that challenge them to advance their thinking skills. From this perspective, developing critical thinking skills would require more than a two-year programme.

The above discussion provided a comprehensive overview of the findings. Following this is a more specific discussion for each of the research questions.

Findings for the research questions

Finding 1

Research question 1: Which aspects of the IBDP preparation support selected learning strategies and dispositions needed for the development of students' 21st century skills?

A review of the literature was the main source of data to address this research question. The researcher aligned information about 21st century skills with aspects of the IBDP. These skills are important for ensuring that the well-being of future societies is sustained. Therefore, the researcher examined UNESCO documents such as "Education for sustainable development" (2010) and "Development agenda of Turkey for post-2015" (2013).

The students who are prepared to be successful in a complex 21st century need advanced learning and innovation skills, life and career skills, productivity and

accountability, leadership and responsibility (Partnership for 21st Century Learning [P21], 2015). The review of the literature was used to confirm that many of these dispositions and cognitive skills are gained through the IBDP. In particular, the current study focused on how students understood that their learning strategies, dispositions, and critical thinking were developed in their pre-IBDP programmes. The results revealed that the communication skills students acquired were also highly valued. Critical thinking skills and communication skills help students ask thoughtful questions, share new ideas, analyse and evaluate evidence, and present arguments and findings.

Among selected skills needed to contribute to a sustainable future (Scott, 2015), this current study investigated and found that students valued the following:

- Capacity to use processes such as knowing and inquiring
- Ability to think critically
- Ability to communicate effectively

These skills are also related to the IB learner profile attributes, such as being inquiring communicators who are also principled, balanced, reflective, and knowledgeable. To succeed in the IBDP, students need to use metacognitive learning strategies and manage their time properly. The IBPD emphasizes experience in research that needs critical thinking; it involves being knowledgeable and inquiring. Successful students are motivated by their curiosity. Finally, as students pointed out, they need strong communication skills: writing, discussion, and presenting skills to be able to express their ideas clearly and concisely. By developing these particular skills, students consider that they are becoming prepared for the IBDP which enhances their motivation level for further learning.

Although these skills will help students contribute to a sustainable future, during the focus groups when students were asked about sustainability in particular, it was clear that their conceptual understanding of sustainability was weak. This is despite the fact that all three approaches include sustainability concepts to varying degrees.

Among the cases, the students that gave the more accurate descriptions of sustainability came from the IBMYP; this may be because sustainability is present in one of the global contexts in the IBMYP curriculum. While the IGCSE was not designed as a sustainability education programme, it does claim to prepare students for life because the curriculum helps them to develop their curiosity and passion for learning (CAIE, 2018b). The IGCSE has comparable goals to the IBO, as their aim is to help students be confident, responsible, reflective, innovative and engaged so that they can be ready for the future. Furthermore, IGCSE does have an Environment Management course in their curriculum (CAIE, 2018c); however, none of the students in the study were registered for this course.

Students from all three cases are to have received an introduction to sustainability through the Turkish national curriculum since it includes sustainability in its general regulations, mainly in its vision for the science and technology curriculum. The vision aims to develop problem solvers, effective communicators with the awareness of the importance of sustainability (MEB, 2013).

Similar to the IBO, MoNEP's goal is for students to be balanced, knowledgeable, principled and caring. Still, there is concern that despite what is written in their documents, the curriculum is more focused on content knowledge compared to skill development (Ateşkan, et al. 2016). Students in this study perceived that their

teachers, coordinators and even administrators implemented the MoNEP curriculum by emphasizing content knowledge and memorization; therefore, it follows that students may not be aware of what sustainability means and how it can help the future generation. Clearly, the role of sustainability in the curriculum needs stronger emphasis.

In summary, students were unaware that they were gaining 21st century skills. However this should not mean that the students do not have the skills required for a sustainable future; even though students may not appreciate the long-term benefits of these skills, they are nonetheless acquiring them.

Finding 2

Research question 2: How do students perceive that MoNEP, IGCSE, and IBMYP help develop their learning strategies, in particular metacognitive skills and self-regulated learning, in preparation for IBDP?

The results supported that students from all three programmes developed effective learning strategies. Statistical analysis found no difference among the groups regarding responses about their metacognitive skills and self-regulated learning strategies. The students especially credited their pre-IBDP literature courses with developing their skills related to essay writing, data analysis, lab report writing, presentation and communication. IGCSE students seem to be more self-regulated while IBMYP students expressed some aspects of metacognition.

Self-regulation and metacognitive skills can be related, to some extent, to the following IB learner profile attributes: knowledgeable, inquirers, principled, balanced and reflective thinkers. Gaining these attributes gives students confidence

which motivated them for learning in the IBDP. For instance, they feel themselves knowledgeable enough when they start IBDP, due to learning similar subject content in grades 9 and 10 through their pre-IBDP programmes. However, being knowledgeable about the content is not enough for being successful in IBDP. Students recognize this and emphasized the importance of developing their writing, presentation, analysis, inquiry, discussion and communication skills along with their research and time-management skills.

Since students from all the cases have experienced the national programme, they were able to attest to the emphasis on memorization and rote learning of content in their MoNEP courses. The dominance of this lecture-type, teacher-centred approach to learning limits sufficient opportunities to improve speaking, essay writing, presentation, lab report writing, and research skills. On top of these skills, student-centred approaches would help to educate the whole person (Li, 2012).

According to findings of the current study, when the national programme is enhanced to prepare students for the IBDP, students report that they gain useful skills to help them feel ready for the IBDP. If students report that these experiences help them to feel more prepared for a rigorous international programme, perhaps all students – whether or not they plan to enrol in the IBDP – could be given these opportunities.

Finding 3

Research question 3: How do students perceive that MoNEP, IGCSE, and IBMYP influence their dispositions, in particular attitudes and motivation towards learning, in preparation for IBDP?

Students from all three preparation programmes explained that being given opportunities to develop and apply various thinking and practical skills encouraged them to be responsible for their own learning and sparked their interest and curiosity. They reported that building these competencies gave them confidence that they could succeed in the IBDP. Furthermore, the questionnaire responses indicated they had comparable attitudes toward learning.

Gaining the learning strategies described above were actually the main motivating factor for students. These competencies gave them confidence that they could succeed in the IBDP. All three programmes noted that their language and literature courses improved their writing skills to help them feel more confident in their preparation for IBDP. With IBMYP being aligned with key aspects of the IBDP, such as the learner profile attributes and personal projects, students from this case felt prepared for the IBDP.

Students did note that they were worried about the IBDP exams because they lacked experience studying for intensive tests. Students from Case IGCSE indicated that exam preparation was the main way they gained confidence for the IBDP. Other studies concur that testing is a key skill of the programme (Corlu, 2014). MoNEP students' attitudes towards learning and motivation in the IBDP were less notable compared to the IGCSE and the IBMYP student. This may be because the national curriculum emphasizes memorization and teacher-centred learning and students have

less experience taking responsibility for their own learning. MoNEP students who were studying in the IBDP added that the lab reports they wrote in grades 9 and 10 were not even close to the lab report structure in IBDP internal assessments.

The findings of this study support that it is important for education programmes to provide students with opportunities to develop and practice these skills in their lives; their motivation levels can be increased as students relate their content knowledge with real-life experiences (Barab et al., 2007). A passion for learning and being intrinsically motivated to take action is important for developing autonomous learners (Vansteenkiste, Lens, & Deci, 2006).

Finding 4

Research question 4: How do students from MoNEP, IGCSE, and IBMYP compare in relation to how they exhibit aspects of critical thinking skills?

The results of the study showed that certain learning activities within each programme help develop students' critical thinking skills. When students think about a scientific process and evaluate scientific evidence, they use their critical thinking skills. Science lessons are known in the literature to enhance these skills (Holmes, Wieman, & Bonn, 2015).

When the researcher compared the work of students from the three cases, the IBMYP students' work was more thorough and reflective. This may be because inquiry is such an important component of the programme.

Hwang and Chang (2011) advocate for the development of inquiry to foster students' critical thinking skills. Through inquiry, students become curious, they explore, they

question, and they analyse. The IBO integrates inquiry throughout all its programmes, a practice that may be considered by the other pre-IBDP programmes.

As discussed previously, students from all three cases discussed the importance of communication skills, in addition to critical thinking, for IBDP success. For instance, in the Extended Essay students need to construct a detailed and persuasive argument about a problem they investigate. Furthermore, they need to present their information logically and cohesively. When they can explain cause and effect relationships, they will use critical thinking skills. Undoubtedly, critical thinking and communication are related: thinking carefully and analytically about the content of the information they learn will help students gain confidence to express their ideas clearly (Shukri, 2015).

Implications for practice

The main purpose of this study was to investigate three different approaches to IBDP preparation. The findings provide implications for how they all can be enhanced to further improve student readiness an international education programme at high school level.

Students from all the programmes discussed the importance of being prepared for exams in IBDP. Ironically, although the IBMYP is an IB programme, students from this case perceived that they were least prepared for IBDP exams. The students from IGCSE were most able to provide strategies they have developed to prepare for exams and seemed to express the least test anxiety. Therefore, all three preparation programs could implement strategies to develop students' self-regulated learning.

For example, students could receive lessons on time management and developing checklists. Furthermore, their metacognition practices could be improved by helping them practice reflecting on their learning and learning how to design self-assessments.

It is important to note, however, that the nature of assessment in the IBDP is different from that of the national exams. In general IBDP have more open-ended questions. When students are provided with more open-ended questions as in IBDP, they have opportunity to show more of their understanding and critical thinking. Although it is possible to develop multiple choice questions that involve higher level thinking skills, more often they involve students recalling information they have memorised (Martinez, 1999; Scouller, 1998; Simkin & Kuechler, 2005 Stanger-Hall, 2012). Therefore, all three preparation programmes can look at ways to advance their classroom assessments to better emulate IBDP examinations.

One of the main implications learned from this study is that pre-IBDP programmes should become even more skill-based, including more strategies for students to communicate, and collaborate for problem solving. One way to do this is to incorporate the IBO's Approaches to Learning (ATL) skills into any programme that prepares students for the IBDP. These skills are grouped into five closely interrelated categories to improve the quality of teaching and learning: thinking skills, communication skills, self-management skills, research skills, and social skills (IBO, 2015). Programmes can use ATL as a framework to guide programming, ensuring that all five skill areas are being addressed throughout the students' learning careers.

Another way to advance students' higher level thinking skills is to make them more responsible for their learning. Students, especially those from Case IBMYP, expressed that working on their personal projects motivated them and prepared them for the IBDP. These projects involved students in identifying an issue and conducting research around the issue. Through the projects, they seem to improve their communication skills, research skills, self-management, and critical thinking skills. Although MoNEP students complete projects as well, their enthusiasm and interest seemed less effusive. Perhaps this is because IBMYP students had more expectations regarding the planning and completing their projects. It is apparent that students in grades 9 and 10 may benefit if they are given a project and encouraged to work more independently.

Other researchers support the importance of students taking more responsibility for their learning to foster critical thinking skills, metacognition and reflection (Carlson, 2012; Wiggins, 1998). Another suggestion is to implement criterion-based assessment for personal project outcomes. This strategy helps students better understand the expectations of the process and outcomes of the assignment (Sadler, 2005).

Related to critical thinking is inquiry. The IBMYP students were aware that their teachers had to write an inquiry question for their unit plans. Teachers write the statement of inquiry by incorporating one key concept, one or more related concepts, and a global context. This statement must be a transferable idea for the students to improve their cognitive skills. Students reported that this inquiry sparked their curiosity and helped deepen their understanding. The other pre-IBDP programmes

might benefit from building into the planning of the unit a more rigorous approach to inquiry to motivate students and foster their critical thinking skills.

In general, this study learned that if students are given opportunities to develop skills and strategies to monitor their learning, they feel more confident and their attitudes towards learning improves. It is also important to challenge students, encourage them to take risks and also help them to succeed. Through these accomplishments, students become more intrinsically motivated to take responsibility for their learning. Finally, as Facione (1990) pointed out, the goal of education should be to foster critical thinking. Aspects of the IBDP's Theory of Knowledge course, where students critique and examine knowledge, can be integrated into classes in grades 9 and 10. Through enhanced assessments and challenging projects, students can be given opportunities to analyze and critique and to become more responsible for their learning.

Suggestions for further research

The study investigated high school students' perspectives on their preparation for IBDP and a sustainable future. A needs assessment with the IBDP graduates could be conducted to learn more of what they require to be successful in the IBDP.

Moreover, the perspectives of other stakeholders, such as IBDP subject area teachers, school administrators, IBDP coordinators and parents, could be assessed to provide broader insights into how these three programmes can be improved to prepare students for a better future.

The students in the current study spoke highly of their language and literature studies. Further research should be conducted to enhance our understanding of how these courses improve students' critical thinking and communication skills. The outcomes of the study could provide a "best practices" that could be used to improve other courses.

This study had students report on current and past IBDP preparation. A longitudinal study could be conducted with students to learn about any long-term implications of their learning experiences. The research could compare how students from the three programmes apply their learning strategies, dispositions, critical thinking, and communication skills to their university courses and their careers. Furthermore, the study could learn if students take an active role to resolve societal and environmental issues.

The findings of this study did not evaluate whether the development of certain skills has enhanced students' academic success in their pre-IBDP or IBDP courses.

Therefore, academic performances of the participants might be analysed in a future study. In addition to this, the predictors of students' academic success can be analysed to suggest a statistical model that can be used to account for the academic achievement of IBDP students.

This investigation also recommends that future researchers conduct a deeper content analysis of how 21st century skills are integrated into the curriculum of all three programmes. The analysis could focus on dispositions and skills outlined by sustainability frameworks provided by UNESCO or other agencies. In addition to

analysing the written curriculum, classrooms could be observed to how the skills are fostered through the programmes.

Finally, the findings cannot be generalised to other schools within Turkey or in other countries because this study was conducted in selected private Turkish high schools. To gain deeper insights this study should be replicated in more schools in Turkey and in different countries to see if there are comparable findings.

Limitations

Many of the limitations for this study are also discussed in the Overall findings and considerations. In addition, it may be noted that these study cases have been implementing the IBDP for a varying number of years with Case MoNEP having most recently been recognised as an IBO world school. Nonetheless, all cases have been offering the IBDP for over ten years and have successfully completed at least one evaluation by the IBO.

During data collection, students were asked to focus on their lower high school years; grades 9 and 10. Although the IBDP does not have any prerequisites, schools would like to offer a well-designed curriculum and/or programme to improve particular skills in lower high school students. This curriculum/programme could function as a bridge for their IBDP years. The schools were treated as separate units, although they were compared and contrasted with each other.

Conclusion

According to this study, when the national programme is enhanced by IGCSE or IBMYP in preparation for the IBDP, students report that they gain useful skills to assist success in the IBDP. The dominance of lecture-type, teacher-centred approach to learning that is common in the national programme, limits sufficient opportunities to improve speaking, writing, and research skills. Being inquisitive and analytical are important skills for living in the 21st century. These skills will help them “learn how to learn.” Students need to appreciate that what they learn in the classroom applies to real life and their futures (Ormrod, 2006). Teachers could promote more effective study strategies within their courses to apply real world learning experiences. Effective learning can be encouraged when the students are provided with challenging, supportive, and personalized learning environments. If students report that these experiences help them to be successful for a rigorous international programme, perhaps all students – whether or not they plan to enrol in the IBDP – could be given these opportunities to help ensure that their future will be sustainable.

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Appendix A: Student survey

Dear Students,

The questionnaires in this survey will measure your motivational level, attitudes towards learning, self-regulation and metacognition in preparation years for IBDP. The survey consists of 4 questionnaires. Each questionnaire provides you with a brief description of the expectations on how to answer the questions.

Please read the instructions very carefully and do not leave any question without an attempt.

Your answers will NOT be shared with your school, parents or any other institution but will be used only for the purpose of this study as anonymous.

The time available for you to complete this survey is 15 minutes.

Thank you very much for your support to this study.

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Personal Information

1. Gender: Female Male
2. Age: 14-16
 16-18
 18 and older
3. Programme you are enrolled in
 IBMYP
 IGCSE
 MEB
 IBDP
4. Grade level
 9th grade 10th grade. 11th grade

5. Mother's education level		6. Father's education level	
Not literate		Not literate	
Literate		Literate	
Elementary		Elementary	
Middle school		Middle school	
High school		High school	
Bachelor's degree		Bachelor's degree	
Master's/PhD degree		Master's/PhD degree	

Motivation questionnaire

The following questions ask about your motivation for and attitudes about your classes. Remember there are no right or wrong answers; just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1	2	3	4	5	6	7
Not at all						Very true
true of						of me
me						

In a class, I prefer course material that really challenges me so I can learn new things.	1	2	3	4	5	6	7
I think I will be able to use what I learn in a course in other courses.	1	2	3	4	5	6	7
I'm certain I can understand the most difficult material presented in the readings for my courses	1	2	3	4	5	6	7
In a class, I prefer course material that arouses my curiosity, even if it is difficult to learn	1	2	3	4	5	6	7
I'm confident I can do an excellent job on the assignments and tests in this course.	1	2	3	4	5	6	7
I think the course material in my classes is useful for me to learn	1	2	3	4	5	6	7
When I have the opportunity in a class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	1	2	3	4	5	6	7
I like the subject matter of my courses	1	2	3	4	5	6	7
I am certain I can master the skills being taught in classes	1	2	3	4	5	6	7

Attitudes towards learning questionnaire

The following questions ask about yourself as a student in your classes. Please circle the number that best describes what you think and feel. Remember to say how you really feel. Noone at the school or home will see your answers.

1 2 3 4 5
 Not at all Somewhat Very true
 true true

It's important to me that I learn a lot of new concepts this year	1	2	3	4	5
Some students purposely get involved in lots of activities. Then if they don't do well on their class work, they can say it is because they were involved with other things. How true is this of you?	1	2	3	4	5
Some students look for reasons to keep them from studying (not feeling well, having help their parents, taking care of a brother or sister, etc.) Then if they don't do well on their class work, they can say this is the reason. How true is this of you?	1	2	3	4	5
One of my goals in class is to learn as much as I can.	1	2	3	4	5
One of my goals is to master a lot of new skills this year.	1	2	3	4	5
It's important to me that I thoroughly understand my class work.	1	2	3	4	5
Even if the work is hard, I can learn it.	1	2	3	4	5

Metacognition questionnaire							
I treat the course material as a starting point and try to develop y own ideas about it.	1	2	3	4	5	6	7
I often find myself questioning things I hear or read in this course to decide if I find them convincing.	1	2	3	4	5	6	7
If course readings are difficult to understand, I change the way I read the material.	1	2	3	4	5	6	7
I make simple charts, diagrams, or tables to help me organize course material.	1	2	3	4	5	6	7
When studying for a course, I often set aside time to discuss course material with a group of students from the class.	1	2	3	4	5	6	7
I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5	6	7
I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for a course	1	2	3	4	5	6	7
When reading for a class, I try to relate the material to what I already know	1	2	3	4	5	6	7
I try to play around with ideas of my own related to what I am learning in this course	1	2	3	4	5	6	7
I try to understand the material in this class by making connections between the readings and the concepts	1	2	3	4	5	6	7

Appendix B: General focus group interview questions for grade 10, 11 and 12

students

GENERAL QUESTIONS FOR RECOMMENDATIONS TO IMPROVE PROGRAMMES

1. How have you or your parents decided you to be involved in IGCSE/MoNEP/IBMY? What are your general experiences with this programme?
2. Suppose that you were in charge and could make one change that would make the programme better. What would you do? What can each one of us do to make the programme better?

MOTIVATION and ATTITUDES TOWARDS LEARNING:

3. How have you been able to use knowledge or skills you learned in one course in a different course?
4. What kind of course materials arouse your curiosity and desire to do research?
5. What makes you confident that this programme will help you do excellent job on assignments and tests in DP? What are the skills you have mastered by the help of this programme which will help you to be successful in DP?

CRITICAL THINKING SKILLS:

6. How would you describe critical thinking? Do you consider yourself a critical thinker? Why or why not?
7. How did this programme provide you with critical thinking skills? What kind of activities did you go through to improve your critical thinking skills?
8. To what extent the exams in this programme required thinking more than rote memorization?
9. How would you describe the following:
 - a. Open mindedness
 - b. International mindedness

SELF REGULATION:

10. How do you study your courses to ensure success? Can you please describe your study habits and the environment briefly?

SUSTAINABILITY:

11. What does sustainability mean to you? Why it would be important to educate young learners in high school for sustainability? Why do we need to consider future generations?

Appendix C: The holistic critical thinking scoring rubric – HCTSR

A Tool for Developing and Evaluating Critical Thinking
Peter A & Noreen C. Facione

<p>Strong 4: Consistently does all or almost all of the following: Accurately interprets evidence, statements, graphics, questions, etc. Identifies the most important arguments (reasons and claims) pro and con. Thoughtfully analyses and evaluates major alternative points of view. Draws warranted, judicious, non-fallacious conclusions. Justifies key results and procedures, explains assumptions and reasons. Fair-mindedly follows where evidence and reasons lead.</p>
<p>Acceptable 3: Does most or many of the following: Accurately interprets evidence, statements, graphics, questions, etc. Identifies relevant arguments (reasons and claims) pro and con. Offers analyses and evaluations of obvious alternative points of view. Draws warranted, non-fallacious conclusions. Justifies some results or procedures, explains reasons. Fair-mindedly follows where evidence and reasons lead.</p>
<p>Unacceptable 2: Does most or many of the following: Misinterprets evidence, statements, graphics, questions, etc. Fails to identify strong, relevant counter-arguments. Ignores or superficially evaluates obvious alternative points of view. Draws unwarranted or fallacious conclusions. Justifies few results or procedures, seldom explains reasons. Regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions.</p>
<p>Weak 1: Consistently does all or almost all of the following: Offers biased interpretations of evidence, statements, graphics, questions, information or the points of view of others. Fails to identify or hastily dismisses strong, relevant counter-arguments. Ignores or superficially evaluates obvious alternative points of view. Argues using fallacious or irrelevant reasons, and unwarranted claims. Does not justify results or procedures, nor explain reasons. Regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions. Exhibits close-mindedness or hostility to reason.</p>

VITA

Öykü Dulun was born in Balıkesir, Turkey, on June 21, 1986. She graduated from the Biology Department, Abant İzzet Baysal University and was accepted to the MA programme in Bilkent University in 2008. She was a student-teacher in Bilkent High School and Bilkent Laboratory International School, Istanbul Robert College, Ankara TED College in Turkey; at Oakham School and Hertfordshire and Essex High School and Science College in the United Kingdom. She graduated from Bilkent University in 2010.

She started to work as a Biology and Theory of Knowledge teacher at Bilkent Erzurum Laboratory School (BELS) which was the first established laboratory school of the Eastern Project. She was the head of the BELS Biology department from 2011 to 2013 and the International Baccalaureate Diploma Programme Coordinator from 2012 to 2014.

She worked as a research assistant in an IB Project coordinated by Dr Armağan Ateşkan in the fall 2015 semester, to prepare a report of the curriculum alignment between IBMYP and MoNEP.

In 2017 she was accepted to the position of Workshop Leadership and Consultancy at the International Baccalaureate Organisation. In 2018, she was offered to become Reader for curriculum development and evaluation by the IBO. Besides her responsibility as an IB examiner in Biology and TOK, she still continues working as a Biology and Theory of Knowledge teacher at Koç School which she joined in 2016.