

Original Paper

Inquiry-based Learning in the Interdisciplinary IB MYP Language Acquisition Class

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Abstract

The main objective of the study is to investigate the effect of inquiry-based learning in the frame of interdisciplinary teaching and learning on English class and the impact that it creates on the IB MYP Emergent and Capable Level students (Grade 5, 6, 7 and 8) in the selected IB continuum school, applying the IB MYP curriculum, in Turkey. Three levels of language proficiency are provided for language classes in IB MYP. The planning is established on the effective choice of a suitable level between Emergent, Capable, and Proficient levels. The set of objectives and each level's needs are used to determine the expectations and set goals for the learners.

The study was conducted by using a mixed approach which uses data collected from 194 middle school students and 8 IB MYP teachers. Each student completed the questionnaire on Inquiry-based Learning. There are 7 Focus Groups; 5 Focus Groups with a random sampling of middle school students and 2 Focus Groups of related subject area teachers. In line with the purpose of study, the selection of subject-area teachers is limited to English, Maths, and Science which use English as the language of instruction in the selected IB school. The data collected from each participant is analyzed with the help of SPSS 22. Under the light of this study, the answer to the question "How does inquiry-based learning affect the language learning process in the IB MYP Emergent and the IB MYP Capable levels?" is provided. The study is designed to be a comparative case study that focuses on the similarities and differences across the two IB MYP levels; Emergent and Capable and how they connect in terms of inquiry-based learning and language acquisition.

It is understood that a student who can benefit from the interdisciplinary learning experience is enriched in terms of the experience of making connections to the real world and showing appreciation of inquiry based learning.

Keywords

Interdisciplinary Learning, Language Acquisition, International Baccalaureate Middle Years Programme, Inquiry-based Learning

1. Introduction

The systems of education have witnessed considerable change affected by industrial revolutions over the centuries. The Industrial Revolution had a huge impact on the perception of education and its purpose for society. Starting from the revolution provoked by the power of steam and throughout the power of wireless technology and applications, the scope of education has changed remarkably.

Systematic and strict degree options have left their place in a stronger interdisciplinary curriculum with collaborative skills and inquiry-based teaching and learning, integrated. This great change in education has also forced educators to catch up with the latest developments, even foreseeing the future's demands to raise capable individuals for the future world (Brown, Lauder, & Ashton, 2008).

The steps of this remarkable change have not immediately shown itself; it has taken years to adapt to the change and see the advantages and disadvantages of the steps. As a result, educators must try to foresee the needs of the upcoming decades and reshape the objectives of the lesson plans and curricula. The future workplace of 21st-century students will ask for interdisciplinary and interpersonal skills. The knowledge of a single discipline will be no longer sufficient, rather knowing the ways of using the knowledge from different disciplines to create solutions to problems will be the most useful skill. While thinking critically and creating unique solutions, individuals must also show a good level of collaboration and cooperation in and out of the workplace.

The International Baccalaureate (IB) focuses on preparing students for life, rather than sitting standardized tests. It accepts the fact that today's students will enter a world different than that was envisioned. Therefore, rather than knowledge based units and lessons, the International Baccalaureate works on designing more skills oriented, inquiry-based lesson contents and programs. The students of the IB are prepared to synthesize information to ask good questions and create solutions to possible problems.

In this study, the effects of inquiry-based learning in the IB MYP Emergent and Capable levels with collaboration between disciplines is investigated.

2. Literature Review

The Industrial Revolutions have been shaping the future of education, the conception of work, and the roles in society. The changing realities in the world have also impacted the concept of education. The content and standards of education have been reformed. The curricula have been changed from teacher-centered, knowledge-based to interactive, inquiry-based and student-centered ones. This change has also promoted the metacognitive, critical thinking and problem-solving skills in the learning process. Education has expanded from the rooms of schools and colleges to online education platforms. These platforms were initiated by some online education companies such as Coursera, Edex, and some are

non-profit like Khan Academy and developed partnerships with universities to create more interactive, life-long learner-centered platforms (Young, 2017). As the productivity of new technologies have enabled the increase in potential of translating knowledge work to working knowledge, reducing the cost of knowledge and the differences between high-skill and low-skill work started to play a crucial role in the businesses (Lauder, Brown, & Ashton, 2011).

Many educational programmes and curricula have been changed to meet the needs and demands of the future workplace. In 2018, the Organization for Economic Co-operation and Development (OECD) decided to put a new area in the Programme for International Student Assessment (PISA) which can enable the assessment of global competence of students. Testing of global competence focuses on students' readiness to live and succeed in today's global economy and multicultural societies. The questions are designed with extracts from newspapers and short stories to raise international-mindedness and intercultural understanding.

According to the OECD, a global competent student must;

- take action for collective well-being
- communicate ideas effectively with diverse audiences across cultures
- recognize and understand different perspectives
- investigate the world beyond (local-global-cultural) (OECD, 2018)

The International Baccalaureate is aware of the importance of global competence in today's and tomorrow's world and highlights its importance in each program. The IB creates an inquiry-based, experiential and collaborative learning environment by integrating media literacy, digital citizenship, and design-thinking practices in the curricula of the IB PYP, the IB MYP, the IB DP, and the IB CP.

The interdisciplinary framework of the IB MYP is an example of the transition from STEM to STEAM teaching and learning methods. The transition of the educational curricula from STEM to STEAM (Science, Technology, Engineering, Arts, and Maths) can enable learners and educators to be engaged with cross-curricular learning and transferable skills. Therefore, this transition can play a key role in preparing students for the jobs which are yet to be created (Economist, 2018). It also allows learners to foster the competencies in critical thinking, communication, collaboration, and creativity by engaging the learners in interdisciplinary and collaborative tasks and projects to lead them to discover their strengths and improve their weaknesses.

The IB MYP Personal Projects are effective tools to develop learners' 21st-century skills and attributes. They help to develop learners' metacognition and reduce dependency on discipline-based content learning. In each four stages of the Personal Project, learners are supported to be independent thinkers (IBO, Personal Project Teacher Support Material, 2021).

3. Data and Methodology

The study is designed to be a comparative case study that focuses on the similarities and differences across the two IB MYP levels; Emergent and Capable and how they connect in terms of inquiry-based

learning and language acquisition. In the selected IB continuum school, grade 5 and grade 6 level students are accepted as the Emergent level, while grade 7 and grade 8 students are as the Capable level. A comparative case study design is used to analyze and synthesize the relationship between the IB MYP levels and combine necessary data and knowledge to find answers to the particular question stated before. The students of the two IB MYP levels participated in the study answering questions of a likert type scale that was shared with the students. Following the questionnaires, the students were invited to focus group interviews and share their thoughts on the particular questions selected by the researcher to get more in depth views on the subject. The researcher also used the qualitative data gathered from the online semi-structured interviews held with English, Science, and Maths subject area teachers.

The data is collected on the effects of inquiry-based and interdisciplinary learning on the success rate of students' language acquisition and development of subject-specific content in their classrooms through surveys and semi-structured interviews and data analysis techniques.

3.1 Quantitative Data Collection Tools

3.1.1 The Attitude Scale towards Research-Inquiry for Middle School Students

The scale "ASYTÖ" (Araştırma Sorgulamaya Yönelik Tutum Ölçeği) developed by Ozan, Korkmaz & Karamustafaoğlu (2016) aims to examine the middle school students' attitude towards inquiry-based learning and research. The number of respondents who answered the scale is 155. The respondents are the students from the IB MYP Emergent and Capable levels (Grade 5, 6, 7 and 8) of the selected private IB Continuum school in Istanbul. ASYTÖ includes thirteen items and three factors. It is a likert type scale with five degrees. The respondents were asked to give the most suitable answer to the statements by choosing one of the five degrees. The degrees of ASYTÖ are stated as "Strongly Agree:5", "Agree:4", "Not Sure:3", "Disagree:2", "Strongly Disagree:1". After implementing the scale, the lowest score obtained from the results is 13, while the highest score is 65. The factors that are included in the scale are listed as "Curiosity", "Avoiding", and "Signification". The "Curiosity" and "Signification" factors include positive statements, however the second dimension "Avoiding" includes only negative statements. The factors of the scale and the statements related to the factors are shared in Table 1 below (Ozan, Korkmaz, & Karamustafaoğlu, 2016).

Table 1. The Pattern of Factors and Statements of ASYTÖ

Factors	Statements	Number of Statements
Curiosity	1, 2, 3, 4	4
Avoiding	5, 6, 7, 8, 9	5
Signification	10, 11, 12, 13	4
Total		13

3.2 Qualitative Data Collection Tools

The literature review of the primary and secondary sources; semi-structured interviews with students and teachers are used to answer the research question “How does inquiry-based learning affect the language learning process in the IB MYP Emergent and the IB MYP Capable levels?”, “How do students develop and put problem-solving and thinking skills into practice in the IB MYP Emergent and the IB MYP Capable levels?”

3.2.1 Semi-structured Focus Group Interviews

Focus groups are used to collect data through the interaction among the respondents, rather than only relying on the individual responses. They allow respondents to discuss a theme or a question given by the researcher.

The themes of the focus group interaction were on inquiry-based learning, research skills, the IB education and the effect of interdisciplinarity. There are five focus group interviews held with the middle school students and two focus group interviews with the IB subject area teachers. The two of the student focus group interviews were with the fifth graders, while the other three student focus group interviews were with sixth, seventh and eighth graders. The researcher divided the student focus group participants in terms of the IB experience. The participants of the group were transfer students from public schools in İstanbul, while the other group’s participants had previous IB experience.

4. Results

The data has a normal distribution, which is checked by Normality tests and Post-Hoc tests. The Skewness and Kurtosis values of the data are used to determine the symmetry and peakedness of the distribution (Pallant, 2010). To analyze the quantitative data, parametric tests, Independent samples T-test, analysis of variance, and ANOVA test are applied.

Options	Score Range
Strongly Disagree	1.00-1.80
Disagree	1.81-2.60
Not Sure	2.61-3.40
Agree	3.41-4.20
Strongly Agree	4.21-5.00

The score collected from the findings of the scale is shared in Table 2 below.

Table 2. The Score Average of ASYTÖ Scale

Scale Range	N	Minimum Score	Maximum Score	Mean
13-65	145	33	65	56,4

Ozan, Korkmaz, and Karamustafaoğlu (2016) stated that the lowest score is 13 and the highest score is 65 as a result of implementing the scale (Ozan, Korkmaz, & Karamustafaoğlu, 2016). As it is shared in Table 2 above, the minimum score obtained from the participants is 33, while the maximum score is 65. When the mean of the scale, 56,4, is considered, it can be said that the participants' attitude towards research-inquiry based learning is positive and considerably high.

The data gathered from the scale on each factor is analyzed with descriptive statistics. The findings of the descriptive statistics are shared in Table 3 below.

Table 3. The Descriptive Statistics and Frequencies of the Factors

<i>Descriptive Statistics</i>		Curiosity	Avoiding	Signification
<i>N</i>	Valid	155	152	155
	Missing	1	4	1
Mean		4,4097	4,3563	4,2177
Median		4,5000	4,6000	4,2500
Std. Deviation		,59421	,66741	,74767
Minimum		2,50	2,60	1,75
Maximum		5,00	5,00	5,00

As it is shown in the Table 3 above, the students who took part in the study achieved a high level in each of the three factors; curiosity, avoiding and signification. When these three factors are compared within each other, there is a slight difference among them. While the curiosity factor ($x=4.4097$, $ss=0.59$) and avoiding factor ($x=4.3563$, $ss=0.66$) are the highest, the signification factor ($x=4.2177$, $ss=0.74$).

In both IB MYP levels, the students are knowledgeable on the concept of interdisciplinary learning. Although the time of the IB instruction has been only for six months in Intensive English Grade 5, mostly in online education, the students have already understood the importance of interdisciplinarity and how it is achieved by Interdisciplinary Units (IDU). The students in the IB MYP Emergent level have also highlighted the benefits of learning Maths and Science in English for their future opportunities and how they use what they learn in one class to understand the content of different disciplines by making connections.

In the semi-structured interview of Grade 6 students, a student mentioned the importance of key concepts to make connections between different disciplines. Global contexts, key concepts and related concepts can play a great role in establishing connections and creating opportunities and enough space for interdisciplinary collaboration. In other words, it is also important for a discipline to find similarities in terms of statement of inquiry and global context to find possible connections to have with another discipline effectively.

The IB establishes its philosophy on a meaningful education which constructs meaning and makes sense of the world. This is achieved by the cycle of Inquiry (asking), Action (doing) and Reflection (thinking). The constructivist approach of the IB allows students to share different perspectives and encourage them as lifelong learners both as individuals of the community and collaborating with others. Therefore, a community of learners are prepared to solve complex problems, create effective solutions and make meaningful connections with the real world (IBO, MYP: From principles into practice, 2014).

The first part of the cycle, which is Inquiry, plays an important role in conducting the IB programmes. Inquiry can be found both in the taught and assessed curriculum of each discipline. This approach is designed to use students' prior knowledge to determine their readiness and establish a basis to start the new learning through awakening students' curiosity. Moreover, inquiry supports the application of conceptual learning by taking learners' attention to the "big idea" as it is the statement of inquiry in the IB MYP. The statements of inquiries or concepts determine the necessary field where learners can share their original ideas and discuss them with the community. In other words, inquiry can drive the student to a deeper level of understanding of a topic and the possibility of transmission of knowledge within different disciplines, which can also be named as interdisciplinarity.

To understand the attitude of the participants to inquiry based learning, ASYTÖ scale was applied. The results of the scale show that there is a significant difference between the Emergent and Capable levels when Avoiding factor is taken into consideration ($p > 0.05$), however for other two factors of the scale; Curiosity and Significance there is no significant difference among the levels.

Table 4. Results of One-Way Anova

ANOVA

		<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>Sig.</i>
Curiosity	Between Groups	1,936	3	,645	1,858	,139
	Within Groups	52,438	151	,347		
	Total	54,374	154			
Avoiding	Between Groups	5,214	3	1,738	4,146	,007
	Within Groups	62,047	148	,419		
	Total	67,262	151			
Significance	Between Groups	3,067	3	1,022	1,859	,139
	Within Groups	83,022	151	,550		
	Total	86,089	154			

The IB offers four programmes: Primary Years Programme (PYP), the Middle Years Programme (MYP), the Diploma Programme (DP) and the Career-related Programme (CP). The content and objectives of each programme provide a meaningful transition from one programme to another. In the case of the IB

MYP, it is important to look at the IB PYP education and if it affects the IB MYP Emergent and Capable level students' understanding of inquiry-based learning.

As the majority of the participants have the IB PYP experience from primary school ($f = 76,3$), the students are assumed to be familiar with the IB philosophy. According to the research done by Drake, Savage, Reid, Bernard and Beres (2015), PYP focuses on three major themes; transdisciplinarity, collaborative engagement and learning journey (Drake, Savage, Reid, Bernard, & Beres, 2015).

Table 5. The Frequency of the IB PYP Experience

<i>PYP</i>		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	119	76,3	76,8	76,8
	No	36	23,1	23,2	100,0
	Total	155	99,4	100,0	
Missing	System	1	,6		
Total		156	100,0		

Having the experience of the IB PYP education has positive effect on the IB MYP students' attitude toward research-inquiry based learning ($p < 0.05$). This positive effect is seen specifically on voiding factor which focuses on students' perception of the use of research and how they value the place of researching in their lives.

Table 6. Results of Levene's Test of Equality

Levene's Test for Equality of Variances

	<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
Curiosity	2,054	,154	1,418	153	,158
			1,300	51,272	,199
Avoiding	5,798	,017	2,297	150	,023
			1,999	48,427	,051
Significance	,408	,524	,657	153	,512
			,650	56,809	,518

Building meaningful interconnections between disciplines is necessary to provide learners with a unique and purposeful learning experience. Although disciplines create frames for learners to make meaningful connections with real life, it is crucial to integrate this knowledge with previous experiences. The IB programmes reach this aim by applying transdisciplinarity in the IB PYP and interdisciplinarity in the IB MYP. Table 7 below highlights the difference between these approaches (IBO, Interdisciplinary teaching

and learning in the MYP Teacher Support Material, 2021). To support the quantitative finding from the Independent Samples T- Test, the questions on the topic of the IB PYP experience and transition to the IB MYP programme were directed to the participants in the semi-structured interviews. These interviews revealed that the students with the IB PYP experience can understand the terminology, concepts and how the IB philosophy, mission and vision is achieved by following a well planned curriculum which enables vertical connections among different levels. The components of the IB PYP and the IB MYP curriculum have a smooth transition from transdisciplinarity to interdisciplinarity which can help students make easier connections among different disciplines and life itself. The students also stated how they observed and interpreted the increasing complexity of the curriculum between the Emergent and the IB MYP Capable levels in terms of level expectations and content.

Table 7. The Approaches to Connected Curriculum

Term	Definition	Examples	Visual Representation
Transdisciplinary	Working across and beyond disciplines, eliminating boundaries Transcends the confines of disciplines to explore an issue using a shared approach for inquiry	Hospital patient well-being team A IB PYP unit of inquiry into the theme “Who we are” principled action in response to climate change (geography and design)	Transdisciplinary theme
Interdisciplinary	Working between more than one discipline, blurring boundaries Interaction among disciplines to achieve new, integrated understanding	Informatics (social sciences and information technology)	Integrated understanding

5. Discussion

According to the research findings, it has been found that the students of IB MYP have a positive attitude towards inquiry-based learning and English classes based on their high score in the applied scales. Although the students enjoy learning English, they are not very sure about the importance of it in their lives. The students of IB MYP are aware of the importance of interdisciplinary learning and that it makes a difference in their learning experience. The use of IDU activities reinforces the learning process and makes meaningful connections between different subject groups to see the bigger picture. Moreover, inquiry-based learning helps students to build deeper understanding in interdisciplinary learning. Having a foundation with the curriculum of IB PYP, the IB MYP students benefit from a smooth transition from transdisciplinarity to interdisciplinarity. The data collected for the research shows that having IB PYP

education effects the IB MYP students' attitude towards inquiry-based learning positively. In other words, the students with the IB PYP experience show a greater tendency to appreciate research in their lives. Thinking is not an isolated activity and it should be supported by social interactions and collaboration. The IDU activities and group work offer great opportunities to foster one's thinking process and problem-solving skills. Particularly, the experience of thinking should be a shared experience of learners. The use of ATL skills supports different types of 21st-century skills from which each individual must benefit.

6. Conclusion

Interdisciplinary learning can not be solely built on a limited set of disciplinary knowledge; the assessment procedure must also be designed accordingly. Unfortunately, the use of standardized tests and single answer questions may lack the necessary qualities for an objective and effective way of assessing. The use of both formative and summative assessments designed based on the content of the interdisciplinary objectives and the students' achievement levels in the group projects and performance tasks provide crucial data to understand each learner's learning process in the IB MYP. A student who can benefit from the interdisciplinary learning experience is enriched by the experience of making connections to the real world and appreciation of inquiry based learning.

This research shows that the students of these two levels show some differences in terms of their foreign language proficiency and the level of making connections to the real world. The students in the IB MYP Capable level proves to be more proficient in using English to solve problems and improve the understanding of the disciplines of science and maths, while the students in the IB MYP Emergent level cannot build meaningful connection to the real world and the benefits of learning English and using inquiry-based learning approach as efficient as the IB MYP Capable level students at the selected IB continuum school.

Although, the IB MYP students at the selected IB continuum school experience a good level of interdisciplinarity, meaningful content and inquiry-based learning, the integration of various activities which can support global competency as mentioned by OECD previously and ATL skills, namely Communication, Social, Thinking, Self-management and Research skills will be crucial for the further development of the IB MYP curriculum. Also, with more interdisciplinary collaboration and unique interdisciplinary learning opportunities for students to build real life connections will result in a more reinforced curriculum and will be more meaningful and beneficial to apply especially in English classes.

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Note

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