Exploring the Effects of Game Based Learning in Trinidad and Tobago's Primary Schools: An Examination of In-Service Teachers' Perspectives

"Research In Brief"

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ABSTRACT

Although game based learning (gbl) has been widely utilized by the military, education, marketing, and advertising sectors, its effectiveness as a learning strategy or training tool is still unclear (Ariffin, Oxley, & Suliman, 2014). The present study addresses this gap and examines the effectiveness of using game based learning in primary school instruction, particularly in Trinidad and Tobago where little research has been conducted at the primary and pre-school levels. This study employs a mixed-methods research approach and is made of (1) a quantitative questionnaire for teachers and (2) interviews with teachers to get their views/perspectives on the benefits or effects of game based learning to the teaching and learning processes. Data findings from the current study should begin to fill in the research gap with respect to using game based learning as an effective teaching and learning strategy in Trinidad and Tobago's primary schools.

Key words: game based learning, teachers' perspectives, & primary instruction

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INTRODUCTION

Game based learning (gbl) is becoming a "way of teaching in education" and consists of two types: (1) digital game based learning (DGBL) and (2) non-digital game based learning (NDGBL) (Naik, 2015, p. 2). Although the NDGBL is the "less popular" form of game based learning, it serves as a "vital part of teaching tools in education (Naik, 2015, p. 2)."

Game based learning, whether in the DGBL form or in the NDGBL form, involves three elements:

- competition—which may involve student vs. student, student vs. teacher, or student trying to gain the highest score he or she can
- engagement—when a child/student plays a game that engages curiosity and imagination, the learning element is NOT noticed, so the child learns for FUN while gaining VALUABLE knowledge/concepts
- immediate rewards—which entail:

  (1) awarding points to the game based learning participant(s)
  (2) giving descriptive feedbacks—teachers can give descriptive feedbacks to their students at the end of their game play, and
  (3) teachers can "acknowledge correct answers" of their students while they are engaged in 'game play.'

(http://study.com/academy/lesson/game-based-learning-definition-and-examples.html)

Overall, one may deduce that game based learning is more transferable to real-world scenarios than the traditional 'chalk' and 'talk' lectures/traditional teaching sessions. In addition to game based learning involving competition, engagement, and immediate rewards, it is also considered to be linked to two key educational theories—*constructivist* and *cognitive theories*. Learning through games is described as one of the most effective ways to learn as games can improve upon: content mastery, social skills, and higher-ordered thinking skills (Adler, 1997, and Stanley, 2009 as cited in Karadag, 2015).

Moreover, some researchers (Biffi et al., 2016; Pinder, 2013, 2008; Sawyer, 2004; Su & Cheng, 2013) believe that game based learning can improve upon constructivist skills such as: students' co-constructing new knowledge, student(s) actively engaging in their own learning process, and student(s)/learner(s) moving away from being novice(s) to becoming expert(s) in concept(s) understanding. In his research study entitled "*Pre-service Teachers' Perceptions on Game Based Learning Scenarios in Primary Reading and Writing Instruction Courses,"* Karadag (2015) emphasized the need for students to develop the following cognitive skills through game based learning:

- concept/content understanding

- higher ordered thinking skills
- memory and thinking skills (recall).

Although game based learning has been widely used by the military, education, marketing, and advertising sectors, its effectiveness as a learning strategy or a training tool is still unclear (Ariffin, Oxley, & Sulaiman, 2014). Scant research has examined how educators perceive the use of game based learning in the classroom as a strategy to improve teaching (Can & Cagiltay, 2006 as cited in Pastore & Falvo, 2010). Further, "understanding teachers' attitudes toward gaming could prove beneficial, thus, there is a growing need for research on this topic (Pastore & Falvo, 2010, p. 2)." This study was conducted because of the aforementioned, and given that there has been very little documented research on game based learning at the primary school level in the Caribbean, specifically in Trinidad and Tobago. The present study fills in the identified research gap in the international research literature.

REVIEW OF LITERATURE

Global Snapshots on Game Based Learning: An Around the World Tour of the Literature on Game Based Learning (Research Findings).

Game based learning research is prevalent in countries such as: the USA, Taiwan, Turkey, and Jordan, but less prevalent in the Caribbean, for example, Trinidad and Tobago.

USA Snapshot

Biffi et al. (2016) in their research "*Developing an educational tool to model food chains,"* came up with a special tool called the *Peruvian Food Chain Jenga*, which was developed as a special educational tool in order to engage upper elementary/primary school children in their thinking about the core ideas of ecosystems. What researchers found were: (i) students had positive opinions of the educational tool as was evident from their scores on their self-reported questionnaires, and (ii) most of the science teachers/educators and professors who had a chance to 'test" and 'comment about the tool' had positive feedbacks about the tool and stated that it could be used as an introduction to a unit or reinforcement/review at the end of a teaching unit.

Pinder's 2008 and 2013 published quantitative findings with grade 1 Atlanta, Georgia African American students and Baltimore City Public School Elementary Teachers found that games influenced students' motivation and science achievement. Specifically, when elementary teachers were questioned about their perceptions on the "effectiveness of gaming and science learning within the elementary classroom," 100% of teachers viewed game board activities as being "highly effective" in increasing students' motivational levels to do science. Sixty percent of the teachers questioned viewed game activities as being "highly effective" in simplifying scientific concepts for K–5 students and the same percentage of teachers viewed game board activities as being "highly effective" in improving K–5 students' conceptualization of scientific concepts.

Students' data also revealed that the use of instructional games with traditional teaching notes were effective in improving students' test scores as 70% of students' post-test 1 scores (recorded after the use of instructional games + lecture notes) were higher than that of their pre-test scores (recorded before the use of instructional games + lecture notes). Additionally, the students' post-test 1 mean score of 97.6% was much higher than their pre-test mean score of 72.9%. In fact, the students' post-test mean score represented a 24.7% increase over that of their pre-test mean score.

Pastore & Falvo (2010) conducted a study entitled "*Video games in the classroom: Pre-and in-service teachers' perceptions of games in the K–12 classrooms*." In their study, a sample of 98 participants—53 in-service and 45 pre-service teachers completed a quantitative questionnaire (survey) and four open-ended interview questions, which examined their "perceptions of gaming in the classroom environment." Results indicated that the two groups of teachers "felt that gaming was a good use of technology for enhancing learning and motivating students," and they felt that "gaming in the classroom would grow in the next five years (Pastore & Falvo, 2010, p. 1)."

Taiwan Snapshot

Cheng, Kuo, Lou, & Shih (2012) conducted a quantitative study consisting of: (1) an experimental study utilizing pre-tests and post-tests, and (2) a 5-point Likert quantitative questionnaire. The pre-test/post-test were used to assess the effectiveness of Cheng et al.'s constructed online competitive game based learning system on 35 Junior high school students' achievement. The experiment lasted 10 weeks. The quantitative questionnaire was used to examine students' (users') satisfaction with the constructed online competitive game based learning system. Results of the study revealed that (i) the online competitive game based learning system was effective for the students' learning, and (ii) most of the students were satisfied with the constructed online game based learning tool (Cheng, Kuo, Lou, & Shih, 2012, p. 1).

Turkey Snapshot

Karadag (2015) conducted a study entitled "*Pre-service teachers' perceptions on game based learning scenarios in Primary Reading and Writing instruction courses."* In his study he utilized 189 pre-service teachers and data were collected by way of a quantitative questionnaire and semi-structured interviews. Results showed that 75%–96% of the teachers agreed to such statements as:

(i) game based learning can be used in any phase of primary teaching
(ii) game based learning practices should be increased in primary teaching, and
(iii) game based learning is an effective tool, which can help to assess or to evaluate primary school students' skill sets

Kirikkaya, Iseri, & Vurkaya (2010) also conducted a study entitled "*A board game about space and solar system for primary school students.*" In their mixed-methods Turkish study, they used 40 primary school students and 16 Science and Technology

teachers. Results found that teachers thought that the game activity used helped to increase students' motivation and students were found to enjoy the use of games.

Jordan Snapshot

Sarhan, Alzboon, Al Mufleh, & Alzboon (2011) and Alzboon, Olimat, & Alzboon (2013) conducted a study entitled *"Features of computerized educational games in sciences of the elementary phase in Jordan from the point of view of specialists in teaching science and computer subjects.*" In their study, a sample of 160 specialists in teaching science and computer were utilized. They also utilized a quantitative study involving the use of two-way ANOVA tests for variance analysis of factorial design (2x2) and Wilks Lambda values calculation for a one-way variance analysis test. The study revealed several results: The participants enjoyed a high awareness level with the features of the computerized educational games, and believe that it was important to insert these features in games designs, but they showed no interest in the features of explorative learning and creative learning. Results also unveiled the lack of differences of statistical signs in the individuals' estimations of the computerized educational games features, owing to the specialization, or to the interaction between the academic specializations, or to the interaction between the academic specialization and the exposure to training in the computerized educational games designing field.

Caribbean—Trinidad & Tobago Snapshot

Documented research in the international research literature on game based learning (whether non-digital or digital game based learning) in the Caribbean in general and in Trinidad and Tobago specifically is seriously lacking especially research at the primary school level with primary school teachers and students. Of the few documented research studies (Kalloo & Mohan, 2012 a & b; Mohammed & Mohan, 2011), the focus has been on either high school or university/college level students. For instance, Kalloo & Mohan (2012 a & b) conducted a study in which they explored the use of game based learning, personalization, and multiple learning strategies, in conjunction with mobile learning as tools to assist in the improvement of high school students' mathematics (algebra) performance. As a result of the aforementioned strategy, Kalloo and Mohan found: (1) students in their study were able to improve their math (algebra) performance and were excited about learning using a "mobile device," but (2) the mobile tool did not appear to make a significant impact on students who were learning algebra concepts for the first time, the real positive effects/benefits were seen only with students who had taken algebra before in a previous term (Kalloo & Mohan, 2012 a & b).

Additionally, Mohammed and Mohan in 2011 in their work "*Using Culture to Motivate Learning in a Digital Game Based Learning Environment*," explored "whether culture can be used to motivate learning and to create appeal in an educational gaming environment such that determinate learning objectives are achieved by players (p.21)." In looking to explore the link between "culture" and "students' learning," the researchers decided to develop an educational game called "*Trinbago Adventures,*" which was to be

“an adventure/driving game, which would offer two modes of game play: (a) allow players to either embark on treasure hunt rallies, or to go on free form exploration of the island’s landscape (Mohammed & Mohan, 2011).” From students’ game play, the researchers are hoping to see a link between “culture” and “learning motivation” for undergraduate university/college students.

RESEARCH QUESTIONS

This study consisted of three standardized non-field based research questions and three field based questions (field interview questions). Thus, this study sought to answer both the standard and field-based questions. The standardized non-field based questions were:

1. How do Trinidadian Primary School teachers in this study describe the impact of instructional games on their students’ learning of educational concepts?
2. What are Primary School teachers’ views on the use of instructional games in their teaching?
3. What are Primary School teachers’ views on the use of instructional games in students’ learning of science and mathematics?

The field based questions were:

1. What are your perceptions/views on the use of a game based learning approach being employed in the traditional teaching of educational concepts, be it science, math, or otherwise?
2. In what ways have game based learning impacted your traditional teaching of educational concepts, be it science, math, or otherwise?
3. In reflecting on your students, in what ways have you seen or identified that using a game based learning approach may have impacted their learning, especially in skill(s) development?

METHODS

- Quantitative section consisting of:

    (1) Teachers completion of a 10-item Likert type quantitative questionnaire (survey)

- Qualitative section (Phenomenological Inquiry approach used) consisting of three semi-structured interview questions assessing teachers’ views/perspectives on game based learning in Trinidad and Tobago’s Primary School

Research Design

The study employs a mixed-methods approach in order to (a) fully address the research problem and its sub-problems, and (b) to provide triangulation of data, which

would make a convincing case if both qualitative and quantitative data lead to the same conclusions (Leedy & Ormrod, 2013). This mixed-methods study involved:

- A quantitative portion employing the use of a teacher quantitative questionnaire.
- A qualitative design that used interview questions to find out primary school teachers' views on the use of games in traditional teaching in a Trinidad and Tobago's Primary School.

Instruments

1. **Teacher Quantitative Questionnaire—A Teacher Quantitative Survey**

Teachers' Perceptions on the Use of Game Based Learning (GBL) in Primary Instruction

The teacher quantitative questionnaire (adapted with permission and with some modifications from Karadag, 2015) contains 10 items and utilizes a five-point Likert scale where 5 = strongly agree, 4 = agree, 3 = neutral/no response, 2 = disagree, and 1 = strongly disagree. Karadag's (2015) teacher questionnaire had been field tested and the reliability rating for each of the two major subscales were reported to be: 0.79 (Cronbach Alpha rating for "the perceptions of teachers on the use of GBL in instruction"), and 0.72 (Cronbach Alpha rating for "the perceptions of teachers on their teaching and students' outcomes/benefits of using GBL").Categories of the scale include: (A) In-service teachers' perceptions on the use of GBL in primary classrooms, and (B) In-service teachers' perceptions on the contributions GBL make/made to teachers' teaching and to their students' skills/skills development.

Examples of items contained on the teacher questionnaire were:

1. I believe GBL can be highly effective in simplifying concepts for primary school students
2. I think developing games in instruction is difficult
3. I think GBL is not effective in primary instruction
4. I think GBL is time consuming in primary instruction
5. I think GBL can make it easier for primary school students to learn any subject (mathematics, science, or otherwise)
6. The use of GBL in primary school classrooms should be increased over time
7. I do not think GBL will contribute to the primary instructional processes
8. I think I can use GBL in any phase of the instructional process
9. I think GBL will make it easier for primary school students to excel in any subject (mathematics, science, or otherwise)
10. GBL is an effective strategy for assessing primary students' skills

2. **Semi-structured Interview Questions for In-service Trinidadian Primary School Teachers:**

The field based questions were:

1. What are your perceptions/views on the use of a game based learning approach being employed in the traditional teaching of educational concepts, be it science, math, or otherwise?
2. In what ways have game based learning impacted your traditional teaching of educational concepts, be it science, math, or otherwise?
3. In reflecting on your students, in what ways have you seen or identified that using a game based learning approach may have impacted their learning, especially in skill(s) development?

Sample Size

15 Trinidadian teachers/practitioners participated in the interview section of this study

Procedures

1st: Administered a self-report quantitative questionnaire to the teachers to assess their views of GBL on their teaching and student outcome/outcomes.
2nd: The final research procedure involved in this mixed-methods study was the conducting of semi-structured interviews with teachers to get their views on the use of games in their lessons.

After conducting the interview, the collected data was coded and some examples of the codes that emerged were: "*positive feelings toward game based learnin*g," "*positive impact of employing game based learning in the teaching/learning processes," and "students' learned different skill(s)."*

Data Analyses

The analyses consisted of two primary components: First, a survey of teachers was taken, followed secondly by the conducting of a phenomenological, semi-structured interview process, which was used to capture teachers'/practitioners' views/perceptions on the use of game based learning in the Primary School instructional process in Trinidad and Tobago.

RESULTS

Quantitative Findings

Survey Results. The first part of this study sought to assess Trinidad's Primary School teachers' views of game based learning in general and specifically their students' achievement and skill(s) development over time. A quantitative questionnaire (survey) was utilized to assess the teachers' views/perspectives. Table 1 (Appendix) shows the overall percentage score of teachers for each itemized response contained within the teacher questionnaire, which where:

Teachers gave "strongly agreed" responses to:

I believe game based learning can be highly effective in simplifying concepts for primary students (50%)
I think game based learning can make it easier for primary school students to learn any subject (60%)
The use of game based learning in primary school classrooms should be increased over time (40%)

Teachers gave "agreed" responses in full to:

I think I can use game based learning in any phase of the instructional process (40%)
I think game based learning will make it easier for primary school students to excel in any subject (50%)
Game based learning is an effective strategy for assessing primary students' skills (50%)

Teachers' gave "disagreed" responses to:

I think developing games in instruction is difficult (40%)
I do not think game based learning will contribute to the primary instructional process (60%)
I think game based learning is not effective in primary instruction (50%)

Qualitative Findings:

The second part of this study assessed teachers' perceptions of game based learning by way of interview questions. Teachers' interview data revealed similar positive results to that seen with the quantitative questionnaire (see Table 1 Appendix); data findings all align to Karadag's (2015) Turkish findings. Overall, 90 percent of teachers interviewed expressed "*positive feelings toward game based learning"* and spoke to the "*positive impact of employing game based learning"* in the teaching/learning processes:

[TEACHER 1, JANE]

> **"GBL has positively impacted my teaching strategies and approaches. . . GBL[has impacted my students' skills:] organizing skills, presentation skills, sharing, taking turns, teamwork, critical thinking, problem solving, empowerment, researching skills/investigative [skills], reading/writing, and calculating skills."**

[TEACHER 8, GEORGINA]

> **"It is a fun way to learn[ing] ……It has made learning fun and students now have a better appreciation for math and science. They are thinking more critically and finding strategies to solve things. They are no longer depending on the teacher to give them information/answers."**

When specifically breaking down the teachers'/practitioners' responses as it relate to each of the three field research questions, their responses were given and outlined in

the following data points presented here in this research. Thus, teachers'/practitioners' had an opportunity to express their view points on how they felt about a game based learning approach being typically employed in the traditional teaching of educational concepts, be it science, math, or otherwise.

[TEACHER 1, JANE]

> **"GBL[game based learning] has application and scope within the new primary curriculum. It provides a new dimension for students to be engaged and [to] actively learn science and mathematics, which in [the] long term would improve academic performance."**

[TEACHER 2, MADGE]

> **"I believe that GBL [game based learning] as a teaching strategy can have a positive effect on the learning of science and mathematics as they [students] are/will be provided with opportunities to be actively involved in their learning (as they are learning by doing)."**

[TEACHER 3, MARIA]

> **"GBL is an important element of learning and achievement at all levels . . . we need to continue these efforts."**

[TEACHER 6, PATRICIA]

> **"This strategy should definitely be adopted at all levels of the education system. The benefits of employing this strategy are patently clear to those who use the time to fill time when formal teaching has been achieved but these moments stand out in students' minds, learning and fun. E-games would increase students' success."**

[TEACHER 7, JACKIE]

> **"GBL does have a positive impact on student learning[;] however[,] I would like to suggest an exploration of student-created games as well as digital games for older primary and lower secondary students."**

Teachers'/practitioners' were asked about the ways in which game based learning have impacted their traditional teaching and their students' learning process, which included their development of skills over time. Teachers spoke to the *positive impacts of game based learning on their teaching* and their *students' learning a variety of different skills:*

[TEACHER 2, MADGE]

> **"The GBL approach has helped my student [with a disability] to retain**

knowledge about numerals, for example, which is something difficult to grasp by children with Down Syndrome."

[TEACHER 3, MARIA]

"It is motivating, arouse interest, great for an introduction to the topic, enrichment lesson or reinforcement lesson . . . [results in] problem solving skills development."

[TEACHER 6, PATRICIA]

"I strongly agree that GBL has worthwhile benefits . . .many students will be keen to participate in the games and will benefit from it[,] especially those who have ADHD whose focus is not long."

Despite the prevailing positive views of GBL, there was very minor reservation expressed about fully embracing GBL:

[TEACHER 1, JANE]

". . . It is not always practical or simple to execute given the short time to introduce, explain, demonstrate, play, reflect, and assess in the given time, not to mention managing student control and participation. It can get quite challenging at times."

In examining the responses of the teachers about game based learning and its impact on their students, both quantitative and qualitative data seem to suggest that the prevailing view point is that *"GBL positively impacts" the teaching/learning processes and "leads to skills development"* in students.

DISCUSSION AND CONCLUSION

The majority of teachers who responded to the questionnaire administered to them believed that "game based learning is an effective strategy for assessing primary students' skills," "can be used in any phase of the instructional process," and "should be increased over time." The aforementioned data findings align with that of Karadag's (2015) findings with pre-service teachers in Turkey. Interview data also revealed that 90 percent of teachers interviewed expressed "*positive feelings toward game based learning"* and spoke to the "*positive impacts of employing game based learning"* in the teaching/learning processes. There were those teachers who felt that game based learning could be used with students with disabilities, for example: Downs Syndrome and ADHD, and those who felt that their students developed critical thinking and problem solving skills among other skills as a result of them employing game based learning in the teaching/learning processes. Thus, from both quantitative and qualitative findings it can be deduced that "GBL positively impacts" the teaching/learning processes and this finding aligns with Biffi et al. (2016), Chen, Kuo, Lou, & Shih (2012), Kalloo & Mohan (2012 a & b), Kirikkaya, Iseri, & Vurkaya (2010), and Pinder (2013 & 2008).

Limitations of the Study

The present study had several limitations, which may affect the interpretation of the results. For the quantitative part of the study, only a small sample of teachers chose to participate. Also, a convenience sampling of participants was used instead of a true random sampling technique. Thus, due to these limitations mentioned beforehand, the findings of this study may not be generalized to a larger population of Trinidad and Tobago's teachers.

Recommendations for Future Research

This study was primarily a small scale qualitative study with some quantitative elements (use of a questionnaire to collect data from teachers), which were used to collect findings on Trinidad and Tobago's primary school teachers' views or perceptions of the use of game based learning as a teaching strategy. To help to fill in the existing research gap on game based learning research in Trinidad and Tobago, it is suggested that more quantitative, qualitative, or mixed-methods research be conducted that can assess/examine in-service and pre-service teachers' views/perceptions of game based learning as a teaching strategy in Trinidad and Tobago's primary and pre-schools.

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Dr. Patrice Juliet Pinder's Bio

Dr. Patrice Juliet Pinder is a native of Nassau, Bahamas, and currently is a visiting Science, Technology, Engineering, and Mathematics (STEM) Education Researcher and STEM Team Leader in Research Development at the University of the West Indies' (UWI's) School of Education, Faculty of Humanities and Education, St. Augustine, Trinidad and Tobago. Recently, Dr. Pinder was selected to be the Untested Ideas Research Center's new editor for the *International Journal of Education and Culture* (*IJEC*). Moreover, Pinder is a scholar/academic who has worked in several international institutions in the USA (Indiana University, Indianapolis, Indiana, & Morgan State University, Baltimore, Maryland), the Bahamas (The College of the Bahamas), and Trinidad and Tobago (currently). She has produced about 30 scholarly research products and currently serves as an external reviewer for some STEM dissertation students at Niagara University, New York.

Dr. Pinder's research studies, which have been published in international journals and presented at international conferences focus on:

- gamification of K–16 education
- STEM equity
- Social justice in education/education equity in general
- Cultural/ethnic differences influence/impact on Afro-Caribbean, African American, and African students' learning patterns in STEM

Dr. Pinder's research on "social justice" in education is currently being used at Boston University in the Education Graduate Course/Class AP 551. Prior to this, Boise State University (EDTECH 541, Spring 2009) and the University of Wisconsin at Stout (EDUC 696C, 2012) graduate classes/students also utilized Dr. Pinder's research in game based learning (gbl).

Dr. Pinder created a game based learning which was field and research based at the University of the West Indies' (UWI's) School of Education in Trinidad and Tobago and she also co-wrote a funded grant application of $58,000 (Pinder contributed 80% to the funded grant application). All of the aforementioned serves as an extension of Pinder's 2008-2013 earlier works on game based learning in the United States.

If you would like to collaborate or to speak further with Dr. Pinder, you may reach her at patricepinder@yahoo.com

APPENDIX

Table 1

In-Service Teachers' Perceptions on the use of GBL in Trinidadian Primary Instruction

			SA	A	N	D	SD
1.	I believe GBL can be **highly effective** in simplifying concepts for primary school students	f	**5**	4	1	-	-
		%	**50**	40	10	-	-
2.	I think developing games in instruction is difficult	f	1	3	2	**4**	-
		%	10	30	20	**40**	-
3.	I think GBL is **not effective** in primary instruction	f	-	-	-	**5**	**5**
		%	-	-	-	**50**	**50**
4.	I think GBL is **time consuming** in primary instruction	f	2	**3**	1	**3**	1
		%	20	**30**	10	**30**	10
5.	I think GBL can make it easier for primary school students to learn **any** subject (math, science, other)	f	**6**	2	1	-	1
		%	**60**	20	10	-	10
6.	The use of GBL in primary school classrooms should be increased over time	f	**4**	**4**	1	1	-
		%	**40**	**40**	10	10	-
7.	I do not think GBL will contribute to the primary Instructional processes	f	-	-	-	**6**	4
		%	-	-	-	**60**	40
8.	I think I can use GBL in **any** phase of the instructional processes	f	1	**4**	2	1	2
		%	10	**40**	20	10	20
9.	I think GBL will make it easier for primary school students to excel in **any** subject (math, science, other)	f	3	**5**	1	1	-
		%	30	**50**	10	10	-
10.	GBL is an **effective** strategy for assessing primary students' skills	f	4	**5**	-	1	-
		%	40	**50**	-	10	-