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Impact of "kubbu" on the Academic Achievement and Motivation of 4th Grade Special Needs Students

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***Abstract* – The purpose of our study is to prove the effect of using a web 2.0 technology tool, Kubbu, on the learning process and performance for the students with special needs. These students show various difficulties which could be physical, emotional, behavioral, or learning related, that cause the student to need additional accommodation or adaptation.**

The research started by interviewing teachers and student's parents with special needs, and conducting a survey with the many professionals who work with students. Then implement activities with Grade 4 class using Kubbu. The results showed positive impact of using this tool in facilitating the learning process of the students, as a great performance level and good understanding for the explained concepts.

***Keywords* – Technology in education, Web tools, Kubbu, Special Needs, Academic achievement, Motivation.**

I. INTRODUCTION

While technology is being used in almost all of our daily life tasks (Seely Brown, 2008), it is a significant factor influencing the usage of cellphones and its different application for chatting, education, schedule meetings, social interaction and many other features. Nowadays, many doctors and therapists are using Skype and other messaging services to chat with parents or patients (Horber et al., 2014). Meanwhile, special needs students still suffer from the inappropriate academic systems used in their schools, which lack use of technology (Mahn, 2015).

Nowadays, many schools abroad are using technology in their systems, even for mainstream students. The importance of three theories, Technology, Pedagogy and content knowledge, offer planning and instructional guidance on the classroom context and desired learning outcomes (Balmeo et al., 2014).

In the late 70's, students with special needs were still educated in special centers and institutions (Starcic & Bagon, 2014). Education of students with special educational needs must take place within the mainstream, with children enrolled full-time in their neighborhood schools and communities. Published a quantitative study on the effects of the use of interactive video in teaching students in mainstream schools who have special educational needs and are mildly handicapped.

The Montana School for the Deaf and Blind in Great Falls, MT., for example, relies on interactive whiteboards to better engage its students. The Washington State School for the Blind has also turned to mainstream technologies to enhance teaching and learning. The Inclusive Schools Network (ISN) located in Huston, Texas is showing the valuable role of the hard-to-reach student's inclusion by increasing the students' engagement by differentiating the instruction and using behavioral supports to help maintain a positive and respectful learning environment. (Szekely, 2011)

The role of Occupational therapists' has to collaborate with the school administrations and teachers (Ide, Yamamoto, & Ide, 2011). Their responsibility counts on developing curriculum and programs, and to identify the modifications needed to implement any adaptation (American Occupational Therapy Assosication, 2016).

A. Research Significance

Our research aims to study the impact of using Kubbu with a group of students suffering from ASD (Autism Spectrum Disorder), ADHD (Attention Deficit and Hyperactivity Disorder) and ADD (Attention Deficit Disorder). They have potential, able to improve and to acquire new concepts. However, their difficulties stop them from improving and therefore cause a delay in their progress.

This study will help us prove that these students can be a functional part of our society and in every business and social field. In schools, our study will help the students acquire the same concepts as their peers, but with an adapted and appropriate tool, that meets their needs. Thus, academically, they will be able to acquire concepts, succeed in their exams and progress and pass their classes.

This research anticipates the opportunity, to improve the learning process and enabling educational and professional opportunities for the students. The long-term aim is to enhance the use of technology, also in the different business fields that can welcome them as a member of their staff.

B. Purpose of the Research

- **Support therapy protocols:** Therapists realized that tools (therapy based assessments), and protocols (therapy protocols), do not always meet the requirements of the students; web 2.0 will help increase the therapy outcome.
- **Support teaching systems and programs:** "kubbu" facilitates the learning and acquisition of new given concepts.
- **Facilitate communication with special needs students :** The special needs students have difficulties expressing their thoughts using their oral or written language (Hasselbring & Glaser, 2000).
- **Provide adequate and adapted tools to the students' needs and strengths:** After answering a question on "kubbu", the teacher is able to evaluate the strengths and weaknesses of the student.
- **Increase the students' self-confidence and encourage them to put effort in tasks:** kubbu encourage them to put a greater effort into tasks while using its features as it gives direct feedback, and provides the chance to correct them in other trial.

- **Create interesting and fun situations during learning:** "Kubbu" will create a fun situation, because they are using their smartphones/tablets or computer.

C. Problematic:

If "kubbu" is applied in the school learning system, it might facilitate the acquirement process and give better academic results (productivity, motivation, engagement) for the grade 4 students who present ADHD, ADD and ASD. These students could perform better, and show more knowledge and skills if the fine motor and the handwriting skills were neglected in their assignments or class activities.

D. Hypothesis:

- Hypothesis 1: Using "kubbu" in the schools' learning system has a positive effect on the students with special needs' level of knowledge and acquisitions. Thus, technological tools can substitute Fine motor and handwriting skills for these students.
- Hypothesis 0: using "kubbu" in the schools' learning system has no effect on the students with special needs' level of knowledge and acquisitions. Thus, technological tools cannot substitute Fine motor and handwriting skills for these students.

E. Definition of terms

- **Occupational therapy (OT):** (World Federation Of Occupational Therapy, 2011) defines Occupational therapy as a client-centered health profession concerned with promoting health and well-being through occupation..
- **Information and communications technology ICT and web 2.0:** (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions. (Tandefelt, 2008). "Web 2.0 can be described nowadays as stage of Web development, defined by a virtual set of user-generated content, based on modern technologies and solutions, interactive concepts enabling constant creation and tolls of rapid communication within the web (Levy, 2009).
- **"kubbu":** (kubbu, 2016) "kubbu" is an e-learning tool designed to facilitate teachers' work and enhance the learning process and it includes different tools and Features. (Hochstetler, 2013) allows a user to create online quizzes, matching games, and crossword puzzles and then be able to place these items on a class website, wiki, or send them to selected email addresses.
- **Autism spectrums Disorder (ASD):** (Varley, 2013) Autism Spectrum Disorder Autism spectrum disorder is a new DSM-5 name that reflects a scientific consensus that four previously separate disorders are actually a single condition with different levels of symptom severity in two core domains.
- **ADHD (Attention Deficit and Hyperactivity Disorder):** (ADHD, 2016) defined ADHD as "a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development".
- **Attention Deficit Disorder (ADD):** (American Pshyciatric Association, 2013)A condition whose symptoms include impulsiveness and a short attention span. It is usually diagnosed in childhood and can interfere with performance at school, in the workplace, and in social situations.

II. REVIEW OF LITERATURE

A. ICT and Special Needs

(Hayes et al., 2010) (Naumes, 2013) Performed studies on interventions to support children with autism to include the use of visual supports fostering their concentration and engagement during the task. While, (Mitchell, 2014) described the tablets and the touch screen by hand-help devices, it offers the student the sensory input and kinesthetic experience for engagement in learning. Video games are used often, but improvements could be made to make them more effective for the therapist.

(Drigas, 2011) conducted that e-technology is a step further for the traditional psychology, by providing the cooperation between therapist, parents-patients, and clients. (Lytras, Carroll, Damiani, & Tennyson, 2008) The psychologists use the Internet for psychological intervention, assessment, orientation, and parental and couple guidance. On the other hand, (Hatzis et al., 2003) introduced some tools used by the speech therapist pathologist: "Speech Kit", "Lee Silverman Voice Treatment (LSVT)", "Speech Training and Recognition for Dysarthria Users of Assistive Technology (STARDUST)".

B. ICT and Occupational Therapy

(Naumes, 2013) integrated the virtual rehabilitation in elderly rehabilitation like "Nintendo", "Wii", and "Xbox Kinect", increased their functional independency and engagement in their lives. As for (Piškur, 2014) used an assistive technology (AS) in the therapy sessions creates a solid coherence between the client occupation and his interest as well as using web 2.0 for communication and society development increase the life satisfaction. (Grandin, 2009) Also, mentioned that autistic children are visual learners and, as such, tend to visualize and think in pictures.

C. *Integrating ICT in Special Education*

(Aksal & Gazi, 2015) conducted a study in Cyprus about integrating informatics communication technology in special education, highlighting the potential need of integrating educational games and application in the curriculum and their importance aim in increasing the student is learning and performance. Moreover, (Balmeo et al., 2014) mark the importance of the teacher's knowledge about using software and hardware in the curriculum, creates efficiency in the special learning. (Schmid & Whyte, 2014) stated that ICT promotes the Special Needs' (SN) social skills self-confidence and communication skills along with their language development and interpersonal skills.

(Redford, 2013) demonstrated some iPad applications, Speech-to-Text, NaturallySpeaking, Sight Words, Lectio, MysteryWordTown, BlueHat GreenHat, WriteInStyle, Promptoo, etc. were built to help the dyslexic students. In addition, The use of ICT has shaped the knowledge and the skills of teachers, therapist, and special educators, which helped them to implement technological strategies of

learning to help each student to overcome his difficulties in learning by pointing out the needs of each individual (Drigas & Ioannidou, 2013).

D. Web 2.0 in Education

(Faizi et al., 2015) (Gwozdek et al., 2008) conducted that the web 2.0 technology in education promotes learning engagement, as well as fosters communication with peers and teachers by executing discussions on the platform. Where, (Bennett et al., 2012) (Betrus, 2012) Indicated that web 2.0 tools permits numerous opportunities to express their manners and self. Also, (Hamilton, 2010) Said that integrating web 2.0 in the healthcare profession connect the students, researchers and the practitioners, As for (Redecker, 2009) who stated that web 2.0 will provide a long life-support learning for these students.

E. Kubbu in Education

Kubbu is a fantastic tool that gives the teacher the ability to monitor the student's activities without even using an email address. "Kubbu" it is for all age group and it is a tool for practicing, revision and assessment, and can be used a home activity (Morris, 2010). (Bernice, 2014) conducted that kubbu engrosses the student in learning. This will help the teacher to track the student's progress as well as compare and contrast students' progress with Kubbu's result database.

(Martin, 2013) claimed in his website the importance of using kubbu in education, as teachers can create activities and promote the students' proficiency in learning and "make the classroom technologically dynamic for the students". Kubbu offer numerous advantages for teachers to create different types of activities. Furthermore, a bonus feature exists that can randomizes the questions which can prevent cheating. In addition, in his blog, Martin developed two specific uses of kubbu, he mentioned the further learner and practice of creating quizzes and educational games with any subject material such as science, art, languages/grammar, etc. all while, promoting social learning. Using kubbu, promote social learning by paring up students into groups to create activities. Scores are shared to encourage competition with other teams or classes.

(kibble, 2007) Indicated that "Kubbu" can be used as an assessment tool, where the study revealed that the use of online practice quizzes would provide better grades for the students. (Hochstetler, 2013) Described Kubbu as a tool that can track a student's performance with statistical analysis. While (Ide et al., 2011) conducted that It is an e-learning tool designed to facilitate the teacher's work and student's engagement used in order to identify their weaknesses.

III. RESEARCH METHODOLOGY

A. Introduction

(Godfrey & Costeloe, 2009) conducted a research about the impact of learning 2.0 on special needs students who suffered from ADD and ASD, along with (kibble, 2007) who had a study about the students who performed better while doing their tasks using "kubbu". In addition, the ICT training with the students with (ID) intellectual Difficulties students would help them in maximizing the benefits of information.

Teachers will use "kubbu" in their teaching process. The web 2.0 tool such as "kubbu", will have positive impact on the grade 4 students who have difficulties in their fine motor and handwriting skills (kibble, 2007). The findings from the previous studies about the Web 2.0, and after gathering sufficient evidence about the extreme likelihood of ICT in education by increasing concentration and reinforcing engagement in the learning process and promoting communication and a proper behavior as well as increasing the students' achievement come to the same conclusion. The data obtained shed light and allowed for the integration of "kubbu" the Web 2.0 tool on grade 4 special needs students in order to develop their engagement, concentration and achievement.

B. *Context of the Study and Participants*

The researchers chose the selective purposive sample (Etikan, 2016). In our study, we focused on 14 candidates from the Grade 4 small group class with specific characteristics (special needs) and in the same age range (8-10 years old) to work with for many reasons:

- Sufficient knowledge in using computers, and in the school computer system (Fedora).
- They have ASD, ADD or ADHD.

C. Ethical Consideration

To start, the first step was taking the school principal's approval. It is to be noted that the principal is a PhD holder in physics, and a democratic leader (Bhatti et al., 2012). Adhering to research code of ethics, none of the students' names were revealed.

D. Variables

Independent variables: Kubbu.

Dependent variables: level of knowledge and acquisitions, fine motor and handwriting skills.

E. Instruments

- The triangulation technique by combining observation (to observe the sample reaction), survey (teachers and parent's survey), interview (with teacher and parents) and documents (from "kubbu" results section)
- Kubbu results section and the level of performance of each student
- Observation (by the researcher) of the student in the computer lab while practicing "kubbu" and directly taking notes had a significant affects overall study

F. Data Collection and Analysis

The third step took place after choosing the sample and getting the principal's approval. Our study's procedure was implemented with many plans of action: a survey and interviews were done with teachers; also, phone interviews were held with the parents. Later on, a training session was held with the homeroom teacher to demonstrate the features of Kubbu.

After creating the account for the students and each had a username, we chose the lesson; the subject and the quizzes. The researcher was always present to observe the students' interaction with Kubbu, taking into consideration their engagement, motivation, reaction, behavior, concentration,

and independency. Also, a Kubbu home activity was sent home. Feedbacks were shared after finishing the activities.

Later on, the researcher gathered the qualitative and quantitative data that he received from the observations and the constructive criticism, and from all the instruments used in this study, in order to analyze them.

IV. Results and Analysis

A. The Quantitative Data

B. SPSS survey data

- **The importance of technology use in their classroom**

80% of the teachers claimed that it is important to use the technology in the classroom

- **Does the ICT facilitate the learning process?**

100% of the teachers responded that the ICT facilitates the learning process.

- **Do you think students with handwriting difficulties will have better results in any task when doing it with technology?**

100% of the teachers think that the ICT will decrease handwriting difficulties and the students will have better results while doing with technology.

- **Will Students who suffer from a lack of attention during an explanation of a lesson, show a longer attention span when it is done with a technology tool?**

80% of the teachers think that the attention span will increase if the student will use the ICT in their learning process, while one of them denied the importance by responding "Not at All".

- **Will Using technology help students acquire the concepts by helping the teachers in planning the explanation and supporting it by visual and digital support?**

60% responded by "most of the time", while 40% answered "rarely"

- **What are the barriers in using computer/ tablets or information technology in your classroom?**

All the teachers responded that the barriers of using technology in their classrooms not having Internet access, the bad connection and the technical supports while two of them responded that there were no barriers.

- **Will students feel more comfortable and engaged answering questions related to a lesson using technology tools rather than in the traditional way?**

80% agree that the ICT increases the student's engagement over the traditional way.

- **Have you heard about the Web 2.0 tools?**

In this question, there was several tools names such as Kubbu, Edmodo, survey monkey, Scratch, Prezi and others. All of the teachers answered negatively, they had no idea about such web 2.0 tools.

C. Kubbu Data

- **First activity: The subject pronouns:**

This activity contained 16 questions with a composer activity form, the students has to fill the blank space with a subject pronoun that they think it fits properly in the sentence.. 10 students obtained a score higher than 70% from the first trial, while two of them took the second trial to optimize their score and one of them did a third trial with the same score. The class average is 76% with a max score 100%.

- **Second activity: the object pronouns:**

The 14-question activity was created using the composer form, with an instructional guide on the top of the page colored in red. In this activity, the students should fill the blank space with an object pronoun that can take the place of the words between brackets. They had an average of more than 60%, while two of them obtained a 93% and one of them 100%. While the two who had an average score of <50% had ASD, and the concept seemed abstract for them.

- **The Home Activity:**

The researcher sent a home activity on "kubbu" with teacher-parent collaboration. It was a 10-15 minute practice in the science subject. The students had to re-read their science lesson and answer three questions on their devices, whether it was an iPad/tablet/ Smart Phone, portable or personal computer. In this activity, they had the chance to do it in 15 minutes (as a time range), maximum, and multiple times (a chance to get better results).

The results showed that 9 out of 12 had a score 100% while 3 out of 9 had 100% on the first trial. In the other hand, three out of 12, scored 50% without any other trial.

D. The Qualitative Data

The qualitative data was gathered from, in-depth interviews, on a one-to-one basis (with the teachers and parents), observation, and open question survey and written report after each session.

- **Parents** phone interviews

All parents claimed that technology has always represented a positive reinforcement for their children as they promise them to get the IPad once they finish their homework or lessons.

60% of the parents claimed that they use technology and the e-learning tools such YouTube while assisting their children at home in the different activities (e.g.: science homework, spelling, reading, etc.), in order to facilitate the concept.

20% of the parents revealed that they do not use any technology devices with their children at home for many reasons: no portable or personal computers available and limited or unavailable Internet access.

Moreover, 20% of the parents were not assisting their children at home, as they finish their work late. These parents hire tutors to help them with their children.

100% of the parents revealed the importance of the ICT in learning, and they were very excited and interested to integrate the new breakthrough learning technique for their children.

- **Teachers'** interviews

All teachers agreed that the technology facilitates the learning process and had the same answer that the students will be more engaged, motivated and concentrated and will give better results. Three teachers consider technology a re-enforcer that optimizes the visual memory to better concept acquirement and improves the attention span. They also shared the importance of following the multi-intelligence process. Another one thought that using technology will increase the effort and will save time for both participants:

for the teacher (lesson preparation, correction…) and for the student (the student will be independent…), and while it is more fun and entertaining as well as it can increase the concentration during the lesson.

E. Discussion and Findings

The researchers addressed a question in the beginning of the research , If "kubbu" is applied in the school learning system, would it facilitate the acquirement process and give better academic results (productivity, motivation, engagement) for the Grade 4 students who present ADHD, ADD and ASD (Mitchell, 2014) ? Can these students perform better, and show more knowledge and skills if we neglect the fine motor and the handwriting skills in their assignments or class activities?

To answer this question, we had two hypotheses:

Hypothesis 1: Using "kubbu" in the schools' learning systems has a positive effect on the students with special needs' level of knowledge and acquisitions. Thus, technological tools can substitute fine motor and handwriting skills for these students.

Hypothesis 0: using "kubbu" in the schools' learning system has no effect on the students with special needs' level of knowledge and acquisitions. Thus, technological tools cannot substitute fine motor and handwriting skills for these students.

F. Hypothesis Validation

These results helped us to confirm the hypothesis 1: using "kubbu" in the schools' learning systems has a positive effect on the students with special needs' level of knowledge and acquisitions. Thus, technological tools can substitute fine motor and handwriting skills for these students.

To summarize, the data results from the teacher's post-interviews, kubbu data Section, SPSS kubbu had a positive impact on the students' concentration and engagement while practicing or even doing a test. Moreover, these students felt comfortable and independent with Kubbu. Thus, their level of performance will increase, along with their self-confidence.

In our research, the focus group usually shows difficulties in a task related to a lesson in class, in the English or Science subjects, which increased the level of anxiety (Melhem, 2016). When they did the practice on Kubbu, their attitude and behavior revealed that, they were comfortable doing the exercise. They also expressed that by saying that it was an easy exercise.

G. Impact of kubbu on the students

- Engaging students in its multiple types of activities and better performance in the whole subjects used on kubbu (Hamilton, 2010).
- Independency in working no requesting of help from teachers.
- Increase their self-independency at home and at the school.
- Acquiring new concepts will be easier than before (Noor-Ul-Amin, 2013).
- Decreasing their handwriting's anxiety, which make them concentrate on the new concepts (Halton, 2008).
- Encouraging the students to practice more a one time, by giving them a chance to practice it without any teacher pen correction (Williams et al., 2006).
- Increasing in their cooperation while they are solving activities along with their increase in their communication skills and social interactions (Lytras et al., 2013).
- Increase their motivation at home and school by giving the pleasure of solving their activities without effort (Noor-Ul-Amin, 2013).

H. Impact of kubbu on teachers

- Decrease the time of preparing, worksheet corrections (Morris, 2010)..
- Increase the class level of performance, more than that, the student's skills in many different areas (daily life skills, new concepts, subjects) (kibble, 2007) (Hayes, Hiran, Marcu, Monibi, & Yeganyan, 2010).
- Preparing and printing the activity (Mark Arthur, 2009).
- Increase teacher's cooperation by sharing their activities on kubbu (Lytras et al., 2013) (Martin, 2013).
- Increase the cooperation between therapist-teacher, teacher-parent to develop their life skills and sharing ideas (Hamilton, 2010).

I. Impact on Parents

- Increased the communication between teachers-parents.
- Increase the reliance on teachers.
- Giving a new hope for their child to improve in their life.

J. Impact on Society

- Giving the students the hope of being productive without the feeling of dismissal (Godfrey & Costeloe, 2009).
- Hiring these students in the society and helping them to improve their selves and to be productive (EURYDICE (Organización) & Agencia Ejecutiva en el Ámbito Educativo, 2009).

V. CONCLUSION

The data collection and the analysis of the results helped us conclude that, kubbu **enhanced the learning** process, improved the students' **engagement and motivation** in completing their task by giving them the pleasure of learning, fortified their **concentration** skills, substituted their **handwriting anxiety**, let them focus on the new given concepts and helped them acquire new lessons. Therefore allowed them to promote their **academic achievement** and their level of performance.

Our study works towards providing a better academic experience for the students who have special needs and towards integrating them in the school systems and in the society (Kienapple et al., 2008). If the use of kubbu, which is a tool that gives the students minimal help, substantially improved the students' performance at school, would the integration of other web 2.0 tools improve the conditions in which they learn or even in which they live.

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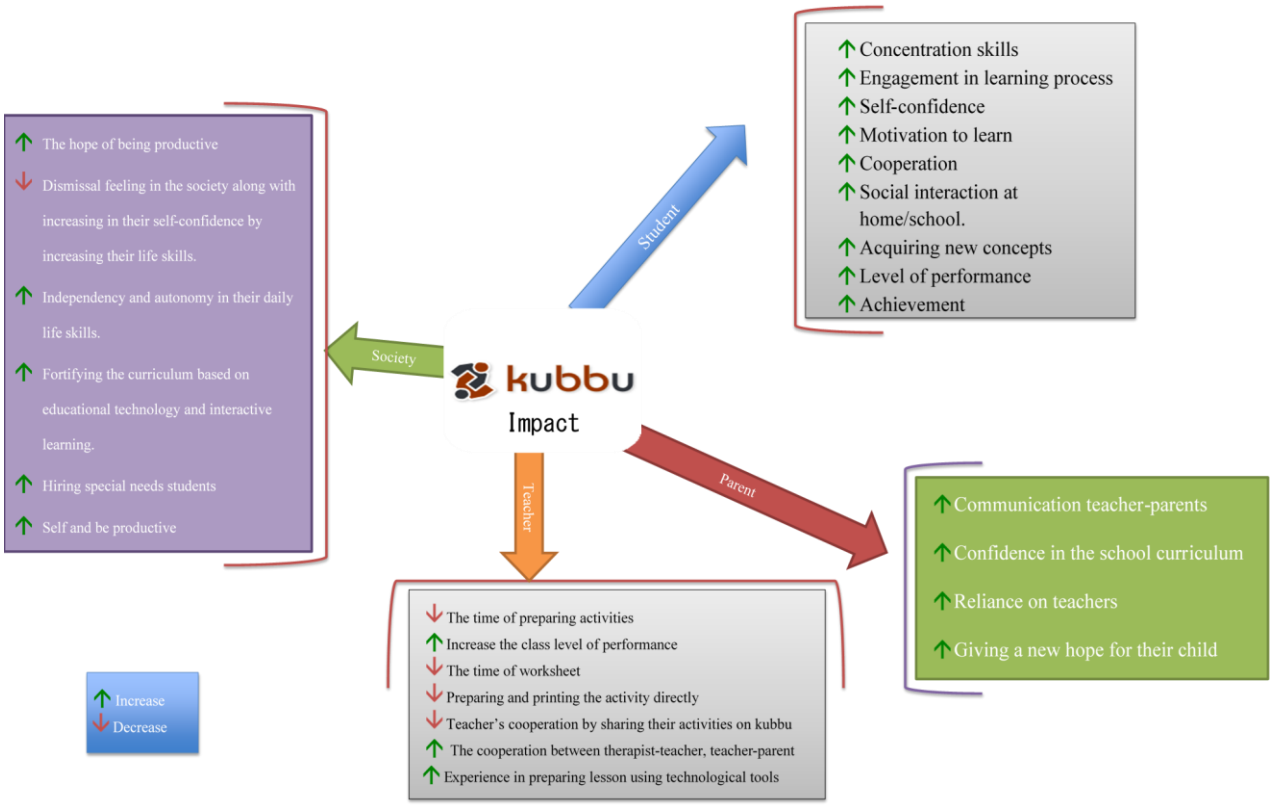

Fig. Impact of kubbu on different sectors (created by the researchers)