The role of si raca app in quantum learning to improve students' motivation and reading achievement

Cahyo Hasanudin ✉, IKIP PGRI Bojonegoro
Ayu Fitrianingsih, IKIP PGRI Bojonegoro
Nofia Fitriyana, IKIP PGRI Bojonegoro
Moh. Dika Hermanto, IKIP PGRI Bojonegoro
Heny Kusuma Widyaningrum, Universitas PGRI Madiun

✉ *cahyo.hasanudin@ikippgribojonegoro.ac.id*

Abstract: Quantum learning is very popular in educational field. It can be implemented easily in elementary school. It will be more interesting when it is collaborated with an application as a learning media. This study aims to investigate the design of quantum learning which is collaborated with Si Raca app and to investigate students' motivation and reading achievements in it. This study is classroom action research that involves 24 students in the first grade of SD Islam Darussalam Kedungrejo, Sumberrejo, Bojonegoro Regency, East Java. This study utilizes research instruments in form of observation sheets which implement the aspect of ARCH and reading tests with indicators of fluency, accuracy, pronunciation, and intonation. Research procedures are started from analyzing problems, designing actions, implementing actions, and reflecting. The data is analyzed using likert scale and it is calculated using simple formula. Moreover, it is consulted with interval scores. Results of study show that the quantum learning collaborated with Si Raca app in early reading is designed using innovative and interactive approach which implements the syntax of TANDUR. There are 50% of students who improve their motivation and reading achievements very well. It can be concluded that Si Raca app has important role in quantum learning. This application is a learning media which is useful for students in improving their motivation and reading achievements.

Keywords: Si Raca App, Quantum Learning, Motivation, Reading Achievement

INTRODUCTION

Reading is one of language activities that utilizes various skills, such as phonological awareness, learning sound patterns, perception of speech, perception of rhythm, and the use of auditory working memory (Tierney & Kraus, 2013) to understand and capture messages from written texts (Hasanudin & Fitrianingsih, 2020). Several researchers determine reading as the most complex cognitive skill that cannot be developed easily, so it needs extensive trainings to master it (Reichle et al., 2013). Reading skill becomes important key for children's educational achievements (Huntsinger, Jose, & Luo, 2016) because it is the basis for mastering all subjects in all educational levels (Koponen et al., 2016). Therefore, students have to have good reading skill, so they are able to obtain satisfactory academic achievements.

Reading is the initial stage of introducing learning environment and developing children's academic skill (Silinskas et al., 2013). Furthermore, learning to read is able to improve children's speaking skill because lexical representation in reading greatly influences spoken language (Mani & Huettig, 2014). Hahnel, Goldhammer, Kröhne, & Naumann (2018) state that the skill of acquiring words, sentences, and discourses in reading influences children' skill in obtaining information. It can be said that reading skill is important because it is a basis in developing various skills including obtaining information and knowledge.

On the other hand, reading is one of complex skills that cannot be mastered easily. Several researchers in Metsäpelto et al. (2017) explain that reading skill has consistent evidence of difficulties experienced by students. In addition, Gao et al. (2018) also argue that students' reading difficulties will impede their future educational outcomes, such as facing bad social and work environtments. This has been proven by millions people, one of them is adults in the United States who do not have good reading skill find it very difficult to work and survive (McKoon & Ratcliff, 2016).

Low reading skill is mostly caused by learning styles that tend to be individual without involving communication with others that can impede students' intention and reading achievements (Kikas, Silinskas, Jõgi, & Soodla, 2016). The same thing happens in Indonesia in which the teaching of current generation is stated to be a cause for concern (Suswandari, 2018) so, there are many primary school students in the final grade cannot master reading skill well (Sumira, Deasyanti, & Herawati, 2018). It becomes worse in Covid-19 pandemic because reading skill cannot be directly controlled by teachers (Fahmy et al., 2021). Therefore, a new learning model/style is needed to overcome the low motivation and reading achievement of Indonesian students.

Nowadays, there are various learning model which can be implemented to improve students' achievements and intention to learn. It can be in form of cooperative learning (Zahro, Degeng, & Mudiono, 2018), learning model which helps students in conducting research and investigation (Retno & Yuhanna, 2018), and optimizing their learning activities such as quantum learning (Rohmanurmeta, 2016). Syntax of quantum learning is known as TANDUR (DePorter & Readon, 2005). Its acronyms are T=*Tanamkan* (Embedding), A=*Alami* (Experiencing), N=*Namai* (Labelling), D=*Demonstrasikan (Demonstrating)*, and U=*Ulangi*(Repeating) (DePorter, Readon, & Singer-Nourie, 2010).

This learning model has ever been examined by Hasanudin & Asror (2017) in early reading at primary scools in Kedungadem Regency, Bojonegoro. It shows that quantum learning collaborated with Bamboomedia BMGames Apps can improve students' early reading skill, so this collaboration is effective to be implemented in future study. Quantum learning can optimize learning activities and provide positive influence that involves the aspects of cognitive psychology, humanistic, academic, and performance improvement (Antariksa, 2021). Novitasari, Sutrimah, & Hasanudin (2020) also argue that innovation of

quantum learning becomes an appropriate solution to overcome students' difficulties in understanding learning materials

Afacan & Gürel (2019) state that innovation of quantum learning is more enjoyable learning process that involves strategies to improve learning achievement. It can make students to be more active, comfortable, happy, and easier in achieving knowledge, so their learning outcomes are getting higher (Kusuma, Gunarhadi, & Riyadi, 2018). It is able to provide more learning experiences which utilize visual, auditory, and kinesthetic games or simulations, so students' right and left brains can be more balanced (Anggara & Rakimahwati, 2021). It can be said that quantum learning is one of innovations in teaching and learning process which is able to improve students' academic achievement.

Quantum learning model has provided satisfactory results on students' skill improvement in learning process. It is supported by Yustiyawati, Hasanudin, & Amin (2021) who implement quantum learning in teaching to write review texts. Its results improve students' scores in all indicators, so it is in good category. However, that research only discusses writing skill, whereas this study focuses on reading skill.

Another study conducted by Khozaei, Zare, Moneghi, Sadeghi, & Taraghdar (2022) utilizes quantum learning to improve students' achievement and motivation to learn. It also proves the success on the use of quantum learning in teaching and learning process. This learning model provides interactive environments in optimizing students' intention to learn, so they can obtain better achievements. However, it only focuses on nursing skill. This study aims to investigate the impact of quantum learning in improving students' motivation and reading achievement.

Furthermore, Nahar, Suhendri, Zailani, & Hardivizon (2022) implement quantum learning to increase students' collaborative thinking skill. Students in Indonesian primary schools have difficulties in mastering it, so cooperative quantum learning is implemented. In the end of class, it is stated to make significant improvement of students' collaborative thinking skill. However, it only depicts the impact of quantum learning in one subject that does not involve reading skill. The researchers also state that teachers have to use learning materials, so it can provide better results. Therefore, this study brings a new concept to create a perfect result of quantum learning by using Si Raca App.

Si Raca is an acronym of *Aplikasi Terampil Membaca* (Reading Skill Application). It contains materials of alphabets, consonants, vowels, syllables, words, sentences, and narrative texts. All of them bring Indonesian local wisdoms. It can facilitate students to in learning to read and understanding Indonesian local wisdoms. The advantage of it is that it can improve students' motivation to read because this application is very simple with various sounds and pictures. The homepage of Si Raca App can be viewed in Figure 1.

FIGURE 1. *The homepage of si raca app*

Based on the problems of low reading skill, the results of quantum learning, and recommendations from previous research, this study presents a new innovation by utilizing Si Raca app in quantum learning. The research problems focus on 1) the design of quantum learning collaborated with Si Raca app, 2) students' motivation and reading achievement in quantum learning collaborated with Si Raca app.

METHODS

Research Design

This study is Classroom Action Research. It can be said as systematic study in the classroom learning using several cycles (Mulyadi, 2023) to improve learning quality (Stiadi & Putra, 2023).

Participant

Research participants are first grade students of SD Islam Darussalam Kedungrejo, Sumberrejo, Bojonegoro Regency, East Java. There are 24 students which are consisted of 11 females and 13 males in 7 to 8 years old. However, the differences of gender and age are not benchmark in this study.

Material

This study uses two research instruments. The first instrument is about motivation and the second is about reading achievement. The instruments are used to investigate students' motivation using observation sheets. These sheets implement the aspects of ARCS which are developed by Keller (1987). It consists of attention, relevance, convidence, and satisfaction as stated in Table 1.

Instrument to assess students' reading achievement is test questions. Reading test in this study is started from reading syllables, words, sentences, and narrative texts. It assesses students' fluency, accuracy, pronunciation and intonation in reading. The instrument of reading test can be viewed in Table 2.

TABLE 1. *Instruments for observing motivation*

No.	Aspect	Indicators
1.	Attention	- Responding to questions or statements about alphabets, consonants, vowels, syllables, words, sentences, and narrative texts. - Minimal body movement and not experiencing many motor disturbances.
2.	Relevance	- Associating reading materials with life experiences. - Understanding reading context helps to obtain academic achievement or carrier in the future.
3.	Confidence	- Dare to read in front of class, share knowledge, and provide feedback - Do not cry or be gloomy when taking mistakes in reading.
4.	Satisfaction	- Feel happy, be interested, and success in reading. - Being able to overcome word, sentence, and text difficult challenges.

TABLE 2. *Instruments for reading test questions*

No.	Type of question	Fluency	Accuracy	Pronunciation	Intonation
1.	Reading syllables				
2.	Reading words				
3.	Reading sentences				
4.	Reading narrative texts				

TABLE 3. *Interval value*

Interval Value (%)	Category	Interpretation
81-100	A	Very Good
61-80	B	Good
41-60	C	Quite Good
21-40	D	Bad
0-20	E	Very Bad

(Daniati, Ismanto, & Luhsasi, 2020)

Procedure

Research procedure is started from analyzing students' problems in early reading at first grade of SD Islam Darussalam Kedungreo. After analyzing problems, actions are designed in overcoming the problems. The next step is implementing quantum learning collaborated with Si Raca app. In its implementations, data of motivation and reading achievement are collected. The last step is reflection. In reflecting, the learning process is reviewed. In this step, learning process, students' motivation and reading achievement are examined, analyzed, and evaluated.

Data Analysis

Data of students' motivation and reading achievement are analyzed using Likert scale. It is started from score 1 as very bad, score 2 as bad, score 3 as quite good, score 4 as good, and score 5 as very good. The scores are calculated using the following formula:

$$Nilai \; Perolehan = \frac{Skor \; yang \; diperoleh}{20 \; (skor \; maksimal)} \; x \; 100$$

(1)

After obtaining students' scores, it is compared with the table of interval value. Its function is to determine category and interpretation of each student's score. The interval value can be viewed in Table 3.

RESULTS

This part presents two important problems of this study, namely the design of quantum learning collaborated with Si Raca app in early reading and students' motivation and reading achievement in it. Both of them are answered in following sub-sections.

The design of quantum learning collaborated with Si Raca app in early reading

The quantum learning collaborated with Si Raca app in early reading is designed using innovative and interactive approach. It aims to utilize quantum learning and Si Raca app to help students in understanding alphabets, consonants, vowels, syllables, words, sentences, and narrative texts in enjoyable and effective ways. Its design can be viewed in Table 4.

This syntax of learning is learning innovation. It can be a way in improving students' motivation and reading achievement in digital era. By introducing this concept, students are used to utilize technology in the future, so they can face technological challenges in digital era.

It can be said that Si Raca app in quantum learning is as a learning media which is very useful for students to improve their motivation and reading achievement based on syntax of TANDUR. The features in application and materials contain local wisdom elements that help teacher to provide appropriate teaching. Si Raca app can be accessed by students in various locations, including remote area. It enables them to improve accessibility and reading skill.

TABLE 4. *Syntax of quantum learning collaborated with Si Raca app*

Concept	Syntax of quantum learning collaborated with Si Raca app
T	- Teacher asks students to sit quietly and look at homepage of Si Raca app on the projector.
	- Teacher starts the application and invites students to find 'enter' button.
	- Teacher asks students to pray as presenting in Si Raca app.
	- Teacher invites students to sing a song in Si Raca app.
	- Teacher shows menus on Si Raca app.
	- Teacher invites students to read the menus on Si Raca app.
A	- Teacher starts all menus of alphabet, consonant, vowel, syllable, word, sentence, and narrative text. She also presents the menu of exercise and game.
	- Teacher asks students to take turns in reading Si Raca app and observe their classmates.
	- Teacher lets students to raise question when they have difficulties in reading or determining words.
N	- Teacher asks students to use game menu to play word puzzles and reading exercises.
	- Teacher asks students to label everything in the game.
D	- Students demonstrate the differences of vowels, consonants, syllables, words, sentences, and texts in Si Raca app.
U	- Teacher accompanies students to read repeatedly the materials in Si Raca app, so they are able to read alphabets, vowels, consonants, syllables, words, sentences, and narrative texts.
R	- Teacher closes the end of learning by giving thanks to God.
	- Teacher appreciates students and asks them to shake hands and sing a song in Si Raca app.

The quantum learning collaborated with Si Raca app in early reading is designed innovatively. It has great positive impact which deals with students' motivation and reading achievement in early reading.

Students' motivation and reading achievement in quantum learning collaborated with Si Raca app

Students' motivation and reading achievement can be assessed by viewing the learning process before implementing and after implementing this design. The design of quantum learning collaborated with Si Raca app is based on early reading problems at SD Islam Darussalam Kedungrejo. The problems are teacher still implement direct instruction and she has not utilized learning media in form of application. Based on research problems, students' motivation and reading achievement before actions can be determined.

Result of observing students' motivation before actions shows that there are 2 students who have very low motivation, 1 student who has low motivation, 4 students who have quite good motivation, 6 students who have good motivation, and 11 students have very good/high motivation.

Result of reading test before actions shows that there are 2 students who have very bad reading achievement, 2 students who have bad reading achievement, 6 students who have quite good reading achievement, 5 students who have good reading achievement, and 9 students who have very good reading achievement. Students' motivation and reading achievement before actions can be viewed in Figure 2.
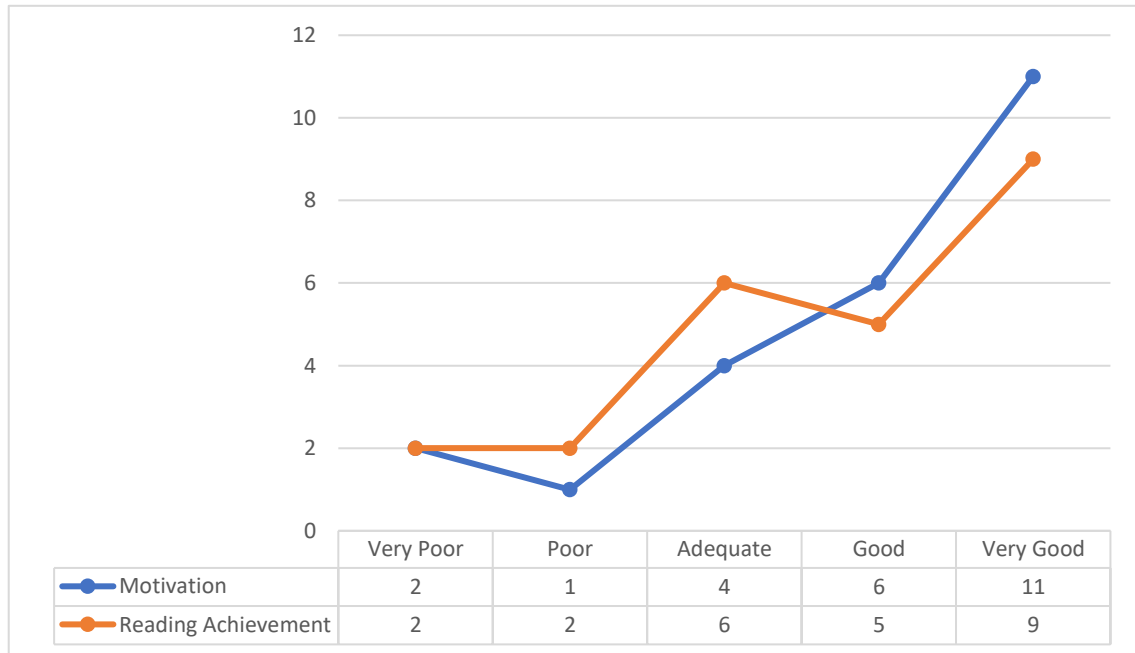
	Very Poor	Poor	Adequate	Good	Very Good
Motivation	2	1	4	6	11
Reading Achievement	2	2	6	5	9

FIGURE 2. *Interpretation of students' scores in motivation and reading achievement before actions*

After determining students' motivation and reading achievement before actions, the researchers implement actions by using quantum learning collaborated with Si Raca app. Students' motivation are increased. There is no student who has no motivation. There is 1 student who quite motivated. There are 4 students who have good motivation and 19 students who have very good motivation.

Results of reading test after implementing quantum learning collaborated with Si raca app show that there is no student who has low score. There are 2 students who have quite good scores, 6 students who have good scores, and 16 students who have very good scores. Students' motivation and reading achievement after actions can be viewed in figure 3.
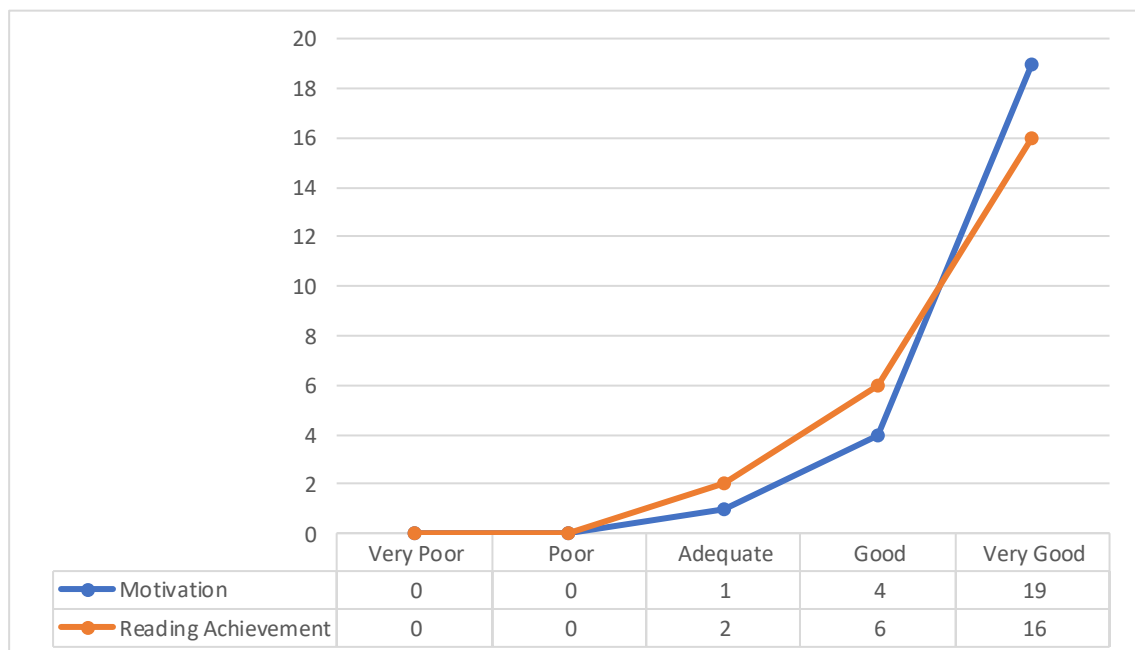

	Very Poor	Poor	Adequate	Good	Very Good
Motivation	0	0	1	4	19
Reading Achievement	0	0	2	6	16

FIGURE 3. *Interpretation of students' motivation and reading achievement in quantum learning collaborated with Si Raca app*

TABLE 5. *Comparison scores before and after implementing quantum learning collaborated with Si Raca app*

Interpretation	Reading Motivation		Reading Achievement	
	Before action	After action	Before action	After action
Very Good	11	19	9	16
Good	6	4	5	6
Quite Good	4	1	6	2
Poor	1	0	2	0
Very Poor	2	0	2	0

After implementing quantum learning collaborated with Si Raca app in early reading, the researchers conduct reflection. Result of reflection shows that there is a decrease in the number of students who have motivation with interpretation score of very low, low, quite good, and good. On the other hand, students who have very good motivation are increased by 8 students. In reading achievement, it shows a decrease in the number of students who have interpretation of very bad, bad, and quite good. On the other hand, there is an increase in the number of students who have reading achievement with good interpretation by 2 students and 7 students who are very good.

It can be said that there are more than 50% of students improve their motivation and reading achievement with interpretation score of very good when quantum learning is implemented and collaborated with Si Raca app. The improvement can be viewed in Table 5.

DISCUSSION

The study of quantum learning with application has ever been discussed in a research entitled *Efektivitas Model Pembelajaran Quantum Learning dengan Media Aplikasi Bamboomedia Bmgames Apps Terhadap Keterampilan Membaca Permulaan pada Siswa Kelas I MI Se-Kecamatan Kedungadem* that is conducted by Hasanudin & Asror (2017). Result of study reveals that early reading skill is improved very well. However, learning achievement from the materials in application is simple related to reading syllables, words, and simole sentences. Moreover, there is no special concern on motivation increasement. Therefore, this study implement innovative application called Si Raca that has many menus from alphabet to narrative text; it investigate students' motivation and reading achievement after actions.

Other research is conducted by Diantoro, Ismaya, & Widianto (2020) entitled *Peningkatan Hasil Belajar Siswa melalui Model Quantum Teaching berbantuan Media Aplikasi Edmodo pada Siswa Sekolah Dasar*. It shows satisfactory result on the combination of quantum learning and materials through application. The improvement obtained is seen in the area of learning outcomes and teachers' skills. Quantum learning that is integrated with application has proven to have a positive impact on teachers and students. This teaching activity is able to help students to improve their knowledge and skills, especially in the field of language. Diantoro, Ismaya, & Widianto (2020) have not explained in detail the forms of students' knowledge and language skills. Therefore, this study wants to further adopt the collaboration of quantum teaching and an application in increasing students' motivation and early reading achievement.

Early reading is not only meant when students know and can distinguish a set of alphabets, but also how they begin to improve their thinking skills through the process of understanding the text they read (Lasdya, Pebriana, Rizal, Abbas, & Rusmaniah, 2022). Reading activities will also determine students' life in modern society, considering that reading greatly influences individual aspiration in the social environment (Jamshidifarsani, Garbaya, Lim, Blazevic, & Ritchie, 2019). This has caused reading to be an important goal in the world of education and an activity that continues to be developed, so

it is associated with new technologies (Albashtawi & Al Bataineh, 2020). Therefore this study aims to answer the challenges in the world of modern education with innovations that can increase students' motivation and reading achievement.

Innovation becomes the learning design which integrates quantum learning and Si Raca app. Quantum learning is the most appropriate method that can make students to be more active, so they area able to obtain their own knowledge (Wijaya, 2021). In addition, it emphasizes students to find their learning styles and reasons for learning it (Kamaluddin & Rusnilawati, 2022). This learning model drives students to be more active in increasing their intention to learn (Sumarno, 2020).

Learning process in the initial stage will make students to be difficult in finding learning motivation, so quantum learning is relevant to improve their intention and learning outcomes (Oktavia & Hulu, 2017) because it is able to create enjoyable, interesting, and motivated learning circumstances effectively (Hikmah, 2019). Its implementation motivates students and increase their academic achievements (Budiarti, 2018). It can be said that data of this study shows that quantum learning greatly influences students' motivation and achievements.

To maximize results of quantum learning, teacher needs delivering tool to interest students to read, such as Si Raca app. The use of application is able to help the success of learning model by providing interesting materials so students are challenged (Harahap & Lubis, 2021). Application is stated to be appropriate to deliver learning material of early reading (Kharisma & Arvianto, 2019) because many materials that can be adjusted with students' skill in primary schools (Widyowati, Rahmawati, & Priyanto, 2020). Material delivery using application has higher effectivity to facilitate students in mastering early reading skill (Fauziah & Hidayat, 2022). Therefore, quantum learning collaborated with Si Raca app is appropriate design to improve students' motivation and reading achiement in early reading.

Moreover, the impact of quantum learning has to be immediately followed by changes in learning interactions, so students can be more active (Fatimah, 2017). Quantum learning utilizes various media in delivering materials to create students' intention, provide direct experience, and implement useful technology (Bolla, 2020). Learning media which is the most suitable with quantum learning is an application that provides various learning materials in fun ways (Mulyaningtyas & Setyawan, 2021). This component is suitable with Si Raca app that provides various level of materials with interesting pictures and menus to give learning experiences for students.

Furthermore, previous researches related to quantum learning or the use of application give positive results. Quantum learning in teaching reading skill is suggested to be implemented, so students can easily understand the meaning of texts (Dewi, Astuti, & Lestari, 2023). However, quantum learning is stated to have weaknesses because there are several students who cannot be active and receive materials well (Nurullah & Nugraheni, 2021). It just able to obtain higher reading achievement when it implements a media that is suitable with students' skills (Ismulya, Amalia, & Maula, 2020).

Based on those explanations, the design of quantum learning collaborated with Si Raca app provides various menus that are suitable with the needs of primary school students, so their motivation and early reading achievement are increased. The application can support quantum learning (Hikmat, Darmawan, Asy'ari, & Tetep, 2020). It provides interesting icons such as pictures and sounds that enable students to remember materials easily and increase their understanding in reading text (Sulistiani, Iswara, & Nugraha, 2023). Therefore, application to deliver material becomes alternative to overcome learning obstacles, so students' motivation and early reading achievement can be increased well (Hadi, 2022).

Selection of appropriate application is very important to obtain learning goals (Rahmasari, 2022) because it determines students to understand the materials easily (Febriani, Mulyana, & Rahman, 2018). Application which is integrated with technology can create students' intention to learn because the materials are very interesting (Intaniasari

& Utami, 2022). The use of application can maximize learning process by understanding materials based on students' abilities (Ali & Zaini, 2020). Therefore, the use of Si Raca app in quantum learning becomes a design that provides improvement of students' motivation and early reading achievement.

CONCLUSION

Conclusion of this study is that Si Raca app has important role in quantum learning. It is a learning media which is useful for students in improving their motivation and reading achievement based on the syntax of TANDUR. The improvement of students' motivation and early reading achievement has not been fully conducted in previous researches. So, result of this study can be adopted in different language skill.

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