Factors influencing virtual learning and the development of its assessment system

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Abstract

This paper aimed at describing the roles of teachers, students, and parents (as the factors influencing virtual learning) and the development of its assessment prototype system. The participants of this research were 50 teachers, 30 students, and 30 parents. This research used Research and Development model. The research findings revealed that teachers had much higher roles on the aspects of *Cheerleader*, *Individual & group mirror*, *Tour guide*, and *Co-learner*; the students on the aspects of *interactivity* and *collaboration*; and parents on the aspects *school collaborators* and *students-learning reminders*; and internet access on *teachers' skill in using digital application*, and *limited ability for parents to access*. Meanwhile, the prototype of assessment system which is developed from portfolio and self-assessments measured eight aspects: *The quality & number of products produced by students; Teacher expertise in preparing learning tools; Teacher expertise in interacting with students; Active participation of students; The ability of students to understand teaching materials; The ability of students to complete assignments; The ability of students to present their assignments;* and *Involvement of parents as facilitators in virtual learning.* This prototype had a value of validity ($\alpha = 0.361$), a value of reliability (0.830 alpha Cronbach), and a value of expert validity (96.5%).

Key-words: prototype, portfolio-assessment, self-assessment, virtual-learning

1. Introduction

Teaching-learning process has been conducted through virtual learning since 16 March 2020 in Indonesia (Harnani, 2020; Faqir, 2020). To anticipate this condition, teachers, students even parents are required to have a good skill in digital literacy which is used to accelerate, to speed up even to ease the process of communication purely and consequently through one of the following virtual applications: WhatsApp, Zoom, Google Classroom, Google Meet, Schoology, Edmodo, Google Form, Socrative, Quizizz, Kahoot!, Moodle, SEVIMA and EdLink (Hartley, et al, 2017; Hermiyanto, 2015; Latip, 2020).

In addition to this, teachers, students and parents need to play important roles or influences in virtual learning. This is due to the fact that these three parties have interrelated tasks during the process of virtual learning. For parents, for example, they have problems with the way how to handle their children joining the virtual learning since they have the only one communications instrument such as computer, laptop, and mobile phone while they have more children to take care about; and at the same time they have also problems with limited internet access. Finally, teachers have obstacles in designing a simple prototype of assessment system.

Therefore, the research problems to be answered in this research can be described as in the followings: a) To what extent are the roles or the influences of teachers in virtual learning?; b) To what extent are the roles or the influences of students in virtual learning?; c) To what extent are the roles or the influences of parents in virtual learning?; d) To what extent is the validity, reliability and expert validity value on the feasible rubric or prototype design of the combination of portfolio and self-assessments as an assessment system in virtual learning?; and e) To what extent is the role of internet access in virtual learning?

2. Literature Review

Teachers themselves still face some obstacles in conducting such kind of virtual teaching-learning process either in preparation, process or evaluation stage (The result of a small survey in March 2021 to 34 teachers within the Province of Riau-Indonesia). In

preparation stage, teachers have some difficulties in designing power-point, modules, video, students' work-sheets, both converting the materials into *portable document format* (PDF) and launching them through one of virtual applications. In process stage, they have difficulties in making connection with students due to the poor features of smart phone including the availability of android application and internet access. Finally, in evaluation stage, they still have inhibiting factors in developing specific assessment system which is based on the principles of *fair* (the students get similar chance & treatment), *objective* (there will be no influence on the aspects of implementation, scoring and students learning achievement), *sustainable* (the information of learning achievement and learning development should be well-planned gradually, regularly, and continuously), *holistic* (the assessment system needs to measure cognitive, affective and psychomotor domains), *open* (the assessment system has the value of public accountability), and *meaningful* (the assessment system draws the strengths, weaknesses, interest, and competency which have been setting up in teaching-learning process) (Kemendikbud, 2014; Pusat Penilaian Pendidikan, 2019).

So, in order to overcome those obstacles there needs a reciprocal collaboration among three parties: teachers, students, parents including internet access. For teachers, for example, they need to play roles or influences in virtual learning as in the following: a) Expert (*having a good skill in hard-ware and soft-ware);* b) Tour guide (*helping students solve their problems*); c) Cheerleader (*activating students for learning*); d) Learning coach (*coaching students for personal approach*); e) Individual and group mirror (*giving students feedback*); f) Social butterfly (*be a host of a big party/learning group*); g) Big brother (*supervising students' activities*); h) Valve control (*compiling lesson material and grouping them into specific topics in order to ease the students' understanding*); and i) Co-learner (*facilitating and companioning students during learning process*) (Bull, 2020; https://hilmanandreas.wordpress.com/2016).

Furthermore, virtual learning will also be effective whenever students show the following characteristics: a) *independent* (having higher level of learning autonomy); b) *fun* (being cheerful in lessons; c) *expressive* (putting forward feelings instead of emotion during question, answer, and discussion sessions; d) *instant* (willing to do what was assigned to them); e) *explorative* (willing to search, investigate, and explore the given tasks using various ways/techniques); f) *sharing* (having the nature/character to communicate what they already know); g) *interactivity* (willing to cooperate during and after learning activities); and h) *collaboration* (willing to work together) (Cepiriyana, 2020).

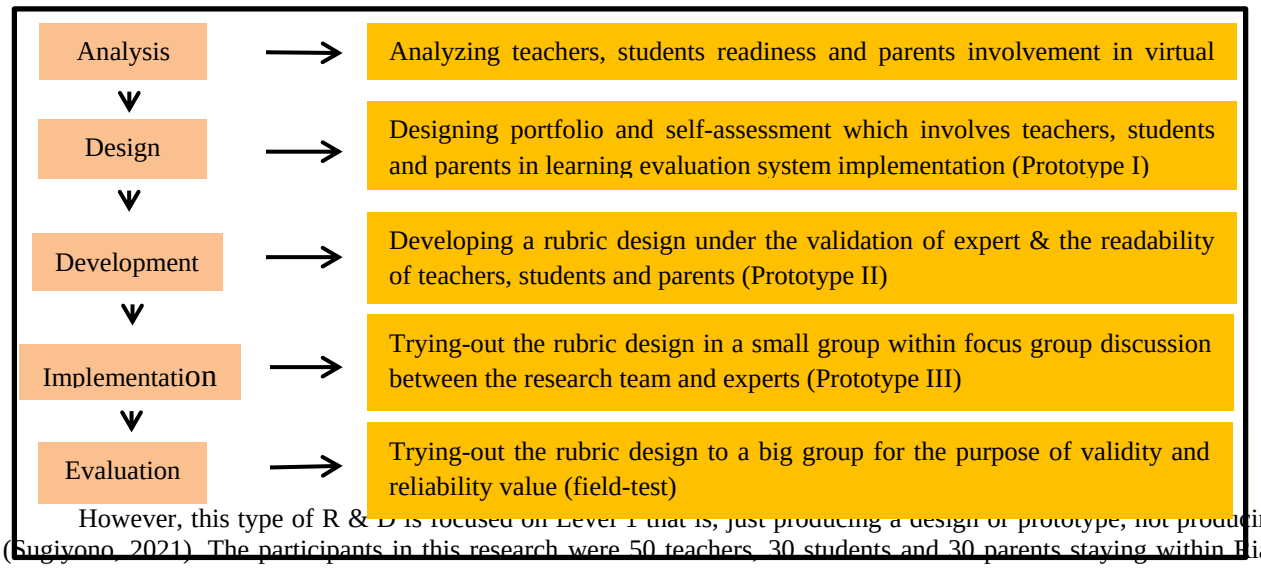
In line with this context, parents also play several roles in virtual learning among others: a) agree on a way to communicate with schools; b) discuss inclusive lesson plans with teachers related to students' condition; c) prepare learning tools; d) ensure that students are ready for learning; e) prepare time to support the virtual learning process; f) encourage students to be active during the learning process; g) ensure students fill out activity sheets as material for daily learning monitoring; h) collect photos of activity sheets and assignments every day; i) actively discuss with teachers regarding the challenges and obstacles faced during the virtual learning process; and j) ensure that the place and learning facilities are comfortable (Passakanawang.com 2021; Yulianingsih, 2021).

Then, in the development of assessment system, the combination of two classroom-based assessments, that is, portfolio assessment and self-assessment is used. The reason for choosing portfolio assessment is due to the fact that portfolio assessment seems to be a massive learning evaluation system. This is considered 'massive' since it is a huge collection of students' works or products; and at the same time, it functions as a physical evidence which demonstrates students' efforts, growths, and learning achievement either from time-to-time or from course-to-course (Popham, 1995; Surapranata & Hatta, 2004). In addition to this, portfolio can also function as a 'track record' and a 'complete report of students' activities including competencies in the aspects of cognitive, affective, and psychomotor (Oosterhop, 2003; Ratumanan, 2021; https://www.amongguru.com 2021).

In connection with self-assessment, it purposely aims at giving students chances to identify their strengths and weaknesses in relation to their way of learning by themselves. Therefore, self-assessment is not only student-centered but also has several characteristics such as clarity, transparency, power, and freedom to build their own active learning system; to judge their learning outcomes; and to control their strengths and authority particularly in undertaking the given guidelines as well as requirements (Orsmond, 2021; Boud and Brew, 2021). In line with this, self-assessment can be categorized as self-contributor, environment learning supporter, self-collaborator, and self-promoter in terms of learning activities. This is due to the fact that self-assessment can play important roles as a) self-confidence grower (willing to grow-up their sense of optimistic in learning), b) self-analyzer (willing to analyze their strengths and weaknesses in learning), and c) self-trainer (willing to train themselves to be fair and objective in valuing something). Therefore, it can be shortened that through self-assessment students will be able to activate themselves in various roles during learning activities (https://www.nomifrod.com/2016).

3. Method

The framework of thought of this research is based on descriptive quantitative and research and development (R & D). Descriptive quantitative method is used to describe the roles of teachers, students, parents including internet access in virtual learning (Ndoye, 2017; Creswell, 2005; Arikunto, 2010). Research and development (R & D) method, on the other hand, is used to design and develop the assessment system rubric or prototype in virtual learning as in the following steps (Gall and Borg. 2003).

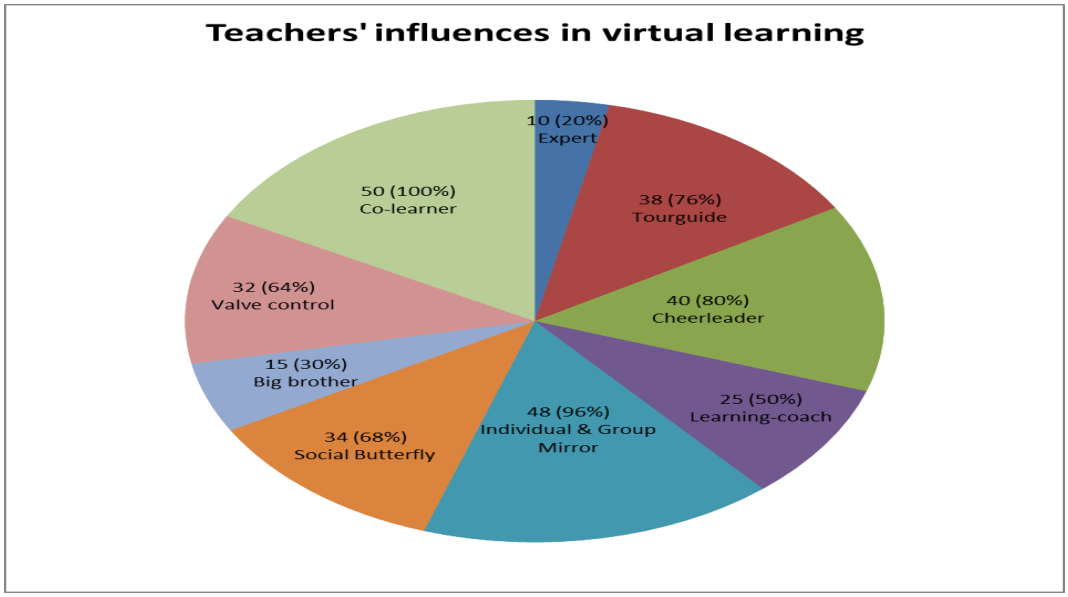


However, this type of R & D is focused on Level 1 that is, just producing a design or prototype, not producing a product (Sugiyono, 2021). The participants in this research were 50 teachers, 30 students and 30 parents staying within Riau Province, Indonesia (Purposive sampling technique). The data collection technique was done through a Google Form (for the roles of teachers, students, parents and internet access in virtual learning and their points of view about the design to develop self/peer-assessment and portfolio assessment as an assessment system in virtual learning). Therefore, data analysis is done in two ways, that is, a) by describing data related to the roles of teachers, students, parents and internet access in virtual learning; and b) by finding out the validity and reliability of assessment system prototype in virtual learning (of course without ignoring the experts' value of validity) (Pallant, 2007; Santoso, 2006); Ndoye, 2017).

4. RESULTS AND DISCUSSIONS

4.1. Factors Influencing Virtual Learning

There are four aspects that will be discussed related to the factors influencing virtual learning: teachers, students, parents, and internet access as in the following charts.

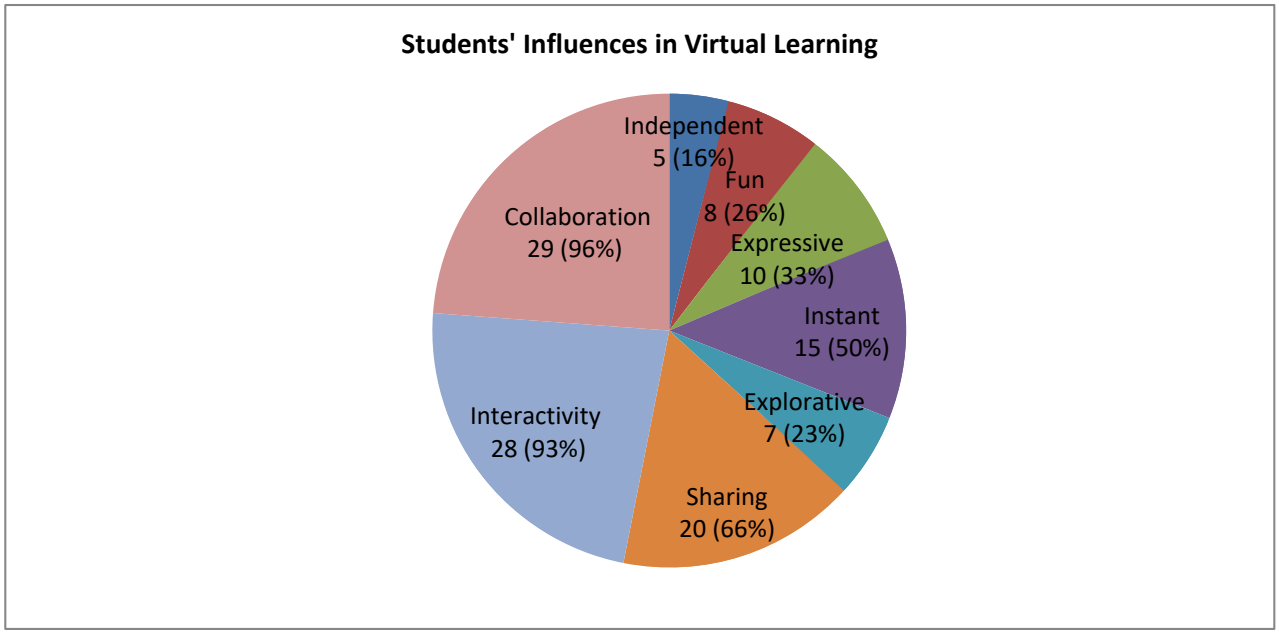


Out of nine aspects discussed in Teachers' influences in virtual learning, it is found that teachers have put more influences on six aspects namely individual & group mirror, social butterfly, valve control, cheerleader, tour-guide, and co-learner (> 50%) but less influences on the aspects of learning coach, big brother, and expert (< 50%). However, the research at SDS Islam An-Nuriyah Jember - Indonesia related to teachers and parents' influences in virtual learning concluded that parents and teachers are

supposed to have reciprocal relationship to minimize a negative impact on children's psychology. This is due to the fact that virtual learning will not run smoothly if parents face problems such as poor supporting facilities, limited understanding of technology, less supervision and care, and internet access interruption. So, teachers in this condition are supposed to have more influences on the aspects of *Big Brother* and *Valve Control* rather than social butterfly, individual & group mirror, learning-coach, cheerleader, tour-guide, expert, and co-learner (Parlindungan, et al. (2020).

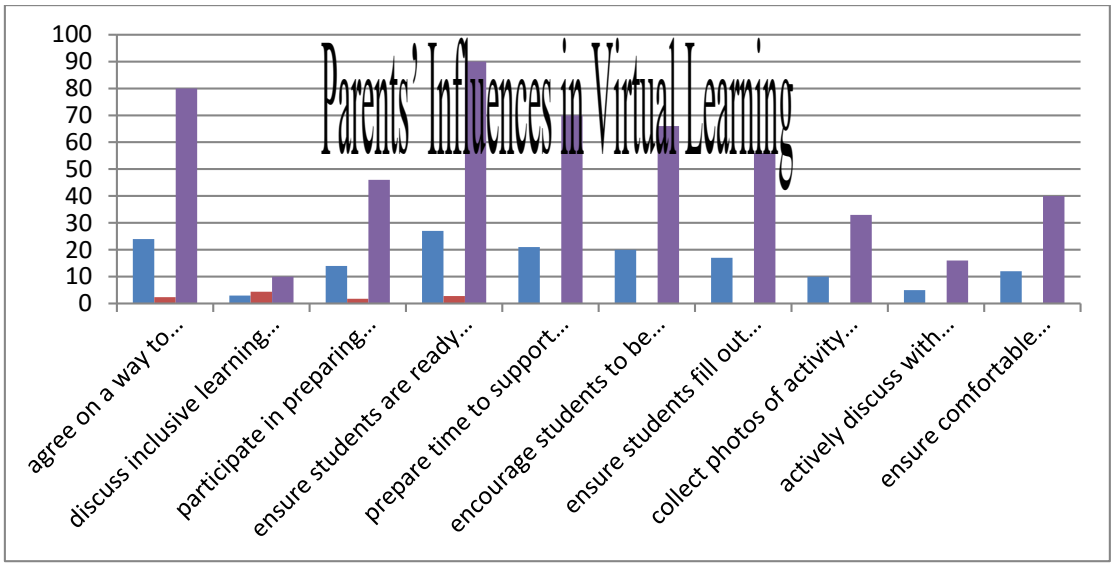
Then, in the research at Surabaya Institute of Technology, it is found that virtual learning yielded only about 77.33% of learning target even though the government gives helps the students on internet quota usage intensity; meanwhile, the research at Muhammadiyah elementary school in Surabaya revealed that learning is only effective around 60-79%. So, virtual learning will be more effective if teachers have more influences on the aspects of *Valve Control* and *Co-learner* (Yashintia, 2020; Kurniasari, et al. (2020).

Finally, in terms of Students' influences in virtual learning, it is found that students have bigger influences on the aspects of collaboration, sharing and interactivity (> 50%) while other aspects such as independent, fun, expressive, instant, and explorative belong to smaller influences (< 50%). In relation to this, the research at State Islamic University of North Sumatera exposed that 68% of the students felt positive about virtual learning particularly on the aspects of staying together with their family, save expenses, and more leisure time. So, virtual learning will be more effective if the students have more influences on the aspects of Interactivity, sharing and Explorative. On the other hand, the research at State Islamic University of Sunan Ampel Surabaya disclosed that 30% of the students considered assignments during virtual learning as a big burden for them. This is due to the fact that they have a lot of troubles with internet access and data package quota. So, in this condition, the students are supposed to have more influences on the aspects of Fun, Independent, Expressive, and Instant (Hasibuan, 2020; Rachmawati, 2020).



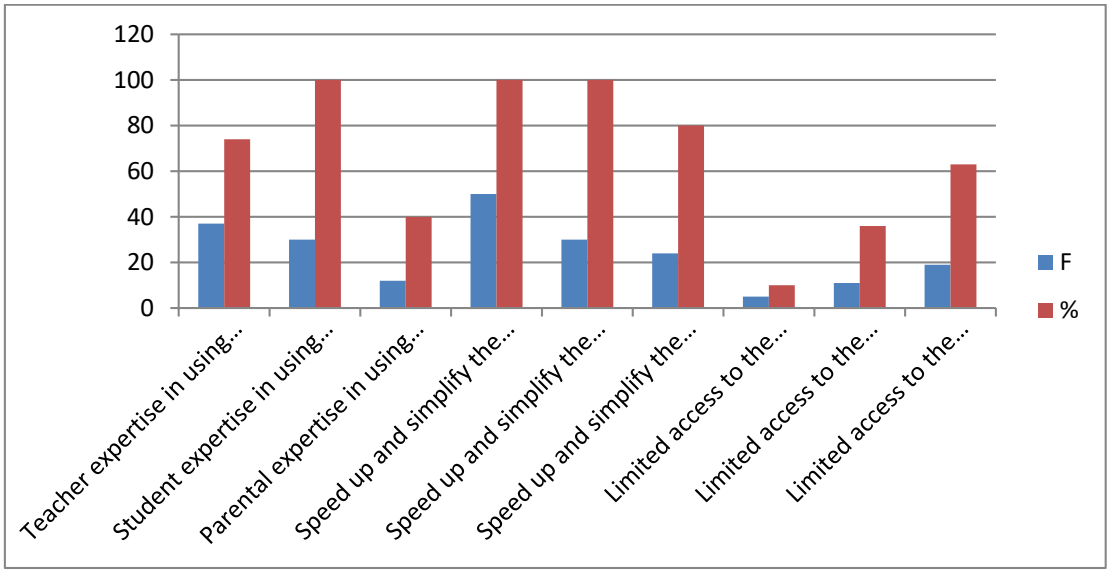
Furthermore, out of ten aspects being discussed in Parents' influences in virtual learning, it is found that four aspects namely agree on a way to communicate, ensure students are ready to follow lessons, prepare time to support the virtual learning, encourage students to be active in leaning process are playing higher influences (> 50%) for parents compared with other six aspects namely discuss inclusive learning plans with teachers related to students' condition, prepare learning tools, ensure students fill out activity sheets as material for daily learning monitoring, collect photos of activity sheets and assignments every day, actively discuss with teachers regarding the challenges and obstacles faced during the virtual learning process, and ensure that the place and learning facilities are comfortable (<50%). However, the research on experiences of parents with children during pandemic exposed that parents supported the school closure policy but they had problems with *"balancing responsibilities, learner motivation, accessibility, and learning outcomes"*. Therefore, they asked educators and policymakers to take into account about this education problem during pandemic covid-19 (Garbe, (2020).

In addition to this, the research in Gunung Sitoli - Indonesia disclosed that parents had normal perceptions on Pandemic but virtual learning makes them difficult economically, psychologically, and socially since they had limited time to watch, supervise even to accompany their children during learning hours. Finally, the research at Jordanian Universities revealed that most parents had burdens on three factors that affect parents' acceptance of university e-learning (financial ability, motivation, and Benefit). So, they need support and help from other parties for the sake of the university e-learning runs smoothly (Lase, 2020; Mahasneh, 2021).



Out of nine aspects being asked in Chart 4 (Influences of internet access in virtual learning), it is found that parents seem to have lower influences particularly in Using digital application (<50%), meanwhile the other aspects such as Speed up and simplify the communication process, and Limited access to the internet for parents due to not having an android application have similar influences as teachers and students do (>50%) as in the following charts.

Influences of internet access in virtual learning



4.2. Assessment system prototype in virtual learning

4.2.1. Prototype I

This Prototype I is developed and designed from the concepts of portfolio and self-assessments which involves teachers, students and parents in learning evaluation system implementation. This is due to the fact that these three aspects play important influences in virtual learning as in the followings:

The Design of Learning Evaluation System in Virtual learning (Prototype I)

No	Aspects	Weight	Score
1	Teachers' skills in preparing learning kits	60	
2	Students' ability in understanding learning material and finishing school tasks	30	
3	Parents' influences in mentoring students	10	
Total		100	

4.2.2. Prototype II

In this stage, the thoughtful contributions from experts are needed to perfect rubric design in Prototype I. Thus, there can be seen the differences between Prototype I and Prototype II as in the following:

The Design of Learning Evaluation System in Virtual learning (Prototype II)

No	Aspects	Weight	Score
1	Teacher expertise in choosing applications that suit the conditions where students are located	10	
2	Teacher expertise in preparing learning tools in ppt, audio, video formats	20	
3	Teacher expertise in interacting with students during learning process	15	
4	Active participation of students, especially in asking & answering teacher questions	10	
5	The ability of students to complete assignments correctly and on time	20	
6	The ability of students to present their assignments	20	
7	Involvement of parents as facilitator/companion in virtual learning	5	
Total		100	

4.2.3. Prototype III

In this stage, the research team and experts have a Small Focus Group Discussion on Prototype II. Thus, there are several improvements/additions to *Prototype II* that will be called *Prototype III;* and finally, this *Prototype III* is used for field-test as in the following:

The Design of Learning Evaluation System in Virtual learning (Prototype III)

No	Aspects	Weight	Score
1	The quality & number of products produced by students to be stored in the teacher's portfolio bundle	20	
2	Teacher expertise in preparing learning tools in ppt, audio, video formats	5	
3	Teacher expertise in interacting with students during learning process	5	
4	Active participation of students, especially in asking & answering teacher questions	10	
5	The ability of students to understand teaching materials, self-reflect and make conclusions	10	
6	The ability of students to complete assignments correctly and on time	20	
7	The ability of students to present their assignments	20	
8	Teacher expertise in choosing applications that suit the conditions where students are located	5	
9	Involvement of parents as facilitators in virtual learning	5	
Total		100	

4.3. The Result of field-test (validity, reliability and correlation)

Data analysis related to validity and reliability of nine aspects as Prototype III has a value of Alpha Cronbach (0.830). This means that all of these aspects are statistically reliable. So, they can be used to measure all concepts available in this research (Chua, 2006; Pallant, 2007; Manning and Munro, 2006; Nunally and Bernstein, 1994). However, in validity statistic (Item-Total statistic), item number 8 is not valid since its Corrected Total Correlation value is low (.129 < 0.3). This low correlation reveals that this item is less uniform with other items and it is deleted from Prototype III.

The correlation for each item of item number 1 until item number 9 shows that r table of $\alpha = 0.01$ (0.361); meanwhile the scores of (item 1 = 0.586; item 2 = 0.675; item 3 = 0.753; item 4 = 0.684; item 5 = 0.695; item 6 = 0.592; item 7 = 0.588; and item 9 = 0.644) is relatively bigger than 0.361. This means that most of the items have moderate and higher level of validity (Hair, 1998; Chua, 2006; Pallant, 2007; Sugiyono, 2012). In line with this result, expert validation reveals that Expert I puts a score of validation of 97% while Expert II 96% which means that this prototype can be categorized 'very significant' to be used as learning evaluation system design in virtual learning within the school in the Province of Riau-Indonesia particularly for online learning process during Pandemic Covid-19. So, the real prototype for this virtual learning is as in the following:

The Design of Learning Evaluation System in Virtual learning (The Final Prototype)

No	Aspects	Weight	Score
1	The quality & number of products produced by students to be stored in the teacher's portfolio bundle	20	
2	Teacher expertise in preparing learning tools in ppt, audio, video formats	5	
3	Teacher expertise in interacting with students during learning process	5	
4	Active participation of students, especially in asking & answering teacher's questions	10	
5	The ability of students to understand teaching materials, self-reflect and make conclusions	10	
6	The ability of students to complete assignments correctly and on time	20	

7	The ability of students to present their assignments	20	
8	Involvement of parents as facilitators in virtual learning	5	
Total		100	

In reference to the use of portfolio assessment in virtual learning, the research at *Oscar Smith High School, Chesapeake, Virginia* concluded that interaction of teachers-students grows very positively; and > 80% of the students feels free to reflect what they have already done and to file the assignments into the portfolio bundle within a certain time (Owen, 1995). Then, the research on the use of portfolio in competency-based learning discovered that it can function as a participated evaluation model which enables students to a) identify problems, b) choose a problem for classroom discussion, c) collect information to be investigated, d) create classroom portfolio, e) provide a portfolio, and f) reflect learning experiences (Setiamihardja, 2021).

Furthermore, the research on portfolio assessment at an elementary school discovered that it gives chances to students to show both their ability and the progress of learning within a certain time validly, fairly, holistically, objectively, continuously, accountably, and meaningfully (Gustina, 2018); meanwhile, the research revealed that portfolio re-teaches and reflects students' learning experiences; there must be a continuous connection between learning process and learning product; and there must be indicators on formative/summative tests, structured tasks, final tasks, anecdotal record, and students activities outside of the school which supports the learning itself (Sukanti, 2010).

Then, the research on learning outcomes and students attitudes found that portfolio assessments increase writing skill and global issue (that is, content & organization), local issue (that is, grammar, vocabulary & mechanic), and students' positive attitudes on English writing skill (Sulistyo, et al. 2020). In line with this, the research on Portfolio assessment model explained that by using this model or prototype, students will be able to show their different abilities in accomplishing assignments; and at the same time, they have more time to use self-assessments on the aspects collecting, selecting, and determining the assignments (Jailani, 2012). Meanwhile, the research on implications for teachers considered that portfolio encouraged students to have a significant influence on the aspects of writing, reading, critical thinking, problem solving, maximizing responsibilities, minimizing exhausting, and activating students in each learning activity (Erdoğan & Yurdabakan, 2010).

In relation to this context, portfolio has several additional values such as a) evaluating the students' growth and progress; b) maintaining good communication between teachers and parents about the students' works/products; c) appointing students to be teachers' partners in the evaluation process; d) helping students reflect themselves suited with 'talent' and 'ability'; e) motivating students to learn, to be proud of, to possess, and to grow self-confidence; f) increasing teacher-student interaction for a certain target; g) reaching learning mastery but not material completion; h) integrating teachers-supervisors' evaluation on teaching program; and i) increasing teachers' professionalisms (Setiamihardja, 2021).

Furthermore, there are at least six principles that must be followed by teachers and students in conducting portfolio assessment: a) mutual trust; b) confidentiality; c) common property; d) selected satisfactory work results; e) in accordance with learning objectives and curriculum; f) process and outcome assessment; and g) result or task given oriented (https://www.amongguru.com 2021). Finally, self-assessment has such characteristics as a) learning activities are highly dependent upon the students themselves, b) students-teachers set up clear and transparent criteria, c) students have power & authority to create learning styles, d) teachers need to give tasks as authentic as possible, e) students are learning actively, f) there always occurs discussion between students & teachers, g) students can practice formative feedback and formative assessment, h) students have an ability to identify their learning weaknesses, i) students will get used to lifelong-learning, j) students will have much higher self-confidence, and k) students may develop their performance & learning quality (Orsmond, 2021; Purbowati, 2020).

Refer to what have been discussed above, it can be concluded that specifically portfolio has multi functions and product oriented; meanwhile self-assessment more focuses on self-introspection whether or not teacher, students, and parents have fulfilled their tasks during virtual learning.

5. Conclusion

Pandemic Covid-19 is still going on until now; so, learning process through virtual learning is still implemented throughout Indonesia. As a consequence, the influences of teachers, students, parents, and the availability of internet access in terms of learning process cannot be separated. In addition, the use of learning evaluation system prototype containing the concept of self-assessment and portfolio-assessment is also suggested. However, teachers, students, and parents are suggested to increase their tactical influences in virtual learning, for example, by having a focus group discussion once in two months talking about obstacles and how to solve them in virtual learning.

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