A Development of Assessment Instruments Analysis Learning Style and Creativity of Elementary School Based on Forward Chaining Method

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Abstract. The aim of this research is knowing whether instrument is feasible or no to get data of research. The instrument of this study is a questionnaire learning style with 66 items consisting of 22 points of statement for each questionnaire of visual, auditorical, and kinesthetic learning styles and learning creativity consists of 48 items. The feasibility test instrument learning style and learning creativity consists of validation, consistency internal, and reliability. Meanwhile, to test the feasibility a used the validity of the contents of the questionnaire. Validator for both questionnaires is expert judgment. There were 60 students as respondents who tested the learning style questionnaire instrument and 64 students as respondents who tested the questionnaire instrument of learning creativity. After undergone a try an instrument there are 45 items that qualified, with 15 items of statement for each of the study visual, auditorical, and a kinesthetic while chief creativity study in get 35 items that qualified based on testing and some revisions of expert judgment.

1. Introduction
One of the level of success of in the process of learning measured using learning style, cooperation and creativity among a participant of the elementary school. The fundamental to the process learning a teacher admit that giving students reading materials that ’too sulit’ can damage learning, and sent down learning style and creativity students. Has been recognised that there a number of factors affect the process reading is creativity students, background knowledge and experience recite before. Because it is basically variable out of control teachers, it is aspects text that have received the most attention [1]. Creativity learning, cooperation and creativity of the elementary school students as distinct from each other, they have the creativity of and the styles of in learning one who is on the great commission to explore his collected knowledge come in learning one who is. Learning style is a whereby school tuition can be explore his collected knowledge come in a purposeful manner and creative ways to cope. One way to solve this problem is by grouping them according to their level of creativity in order to respect student’s and do not seeing them as similar [2]. A participant elementary school students are difficulties with to study because of them do not know how the pattern of their learning. A participant of the primary school students loss of the ability to to study because really do not quite know the style of their learning [3]. One of the most important uses of learning styles is that it makes it easy for teacher to incorporate them into their teaching. There are different learning styles.
Three of the most popular ones are visual, auditory, and kinaesthetic, accommodating teaching to learning styles improves students overall learning results, increases both motivation and efficiency, and enables a positive attitude towards the language being learned. The purpose of using learning styles is to find the best ways for both students to learn effectively and teachers to teach efficiently [4].

On learning, last teachers should have known creativity and learning style from students. In general teachers knowledge of help teachers counseling (BK), teachers counseling (BK) know creativity and learning style students from the spread of chief who have performed before. But in this study will provide in the form of application expert system that can help the teacher more practical analyze learning style and creativity from students by using the method forward chaining. A method of forward chaining is a method of reasoning logic what is predicated to actual facts in order to get the conclusion from the existing fact, obtained that getting a conclusion by forward chaining that is using rules who the premise of in accordance with the fact glory if it is found to get recent fact. A Method of forward chaining is one of methods of expert system who seek or tracing solution through the issue and other words this method do in consideration of the fact and lead to a conclusion based on fact. This method is the opposite of a method of backward chaining who undertakes a quest which was started from hypothesis to support the hypothesis [5]. By using the method forward chaining, explanation not too because subgoals unknown explicitly before in conclusion found. Forward chaining called also bottom-up reasoning or consideration from the ground up, because this method consider of proof in grassroots level, the fact, to a conclusion at the level of over based on facts. Yasser Abdel amid “A Proposed Methodology for Expert System Engineering” Explained that the development methodology of an expert system has two aspects: Knowledge engineering and Software engineering. In the software engineering, there are four activities for expert system development: requirements, specification, design, implementation, and testing [6].

An expert system is a computer program that simulates the thought process of a human expert to solve complex decision problems in a specific domain [7]. A Method of forward chaining is one of methods of expert system who seek or tracing solution through the issue and other words this method do in consideration of the fact and lead to a conclusion based on fact. Expert system uses human knowledge to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting and the organizations employing the technology of expert system has seen an increase in the quality and efficiency [8]. The characteristics of expert systems that make them different from conventional programming and traditional decision support tools [9]. Expert systems should interact with humans in natural language, function despite some errors in the data and uncertain judgemental rules, contemplate multiple competing hypotheses simultaneously, and explain their reasons for requesting additional information when needed. Generally speaking, contemporary expert systems lack any ability to learn, except in the crudest sense. A Development of powerful learning ability and its incorporation into the design of expert systems remains an area of research [10]. To these problem, writer intends to design an instrument learning styles and creativity children elementary school with the methods forward chaining which was able to help teachers and older people in studied several style of learning and creativity on child. With expert system is fast teachers know style students learning and creativity in learning. Expert system has a role in preparation to catch knowledge of experts and data customers of conditions. Expert system has the ability to compile the data collected and the form that will exactly a product [11].

An instrument data collection is the tools chosen and used by researchers in his zeal collect the data to be systematic [12]. Of several expert opinions above, can be concluded that research instruments are the tools used by researchers to collect quantitative information about variables are being investigated. An instrument used in this research of them learning style and creativity learning. Before instruments used for data collection, so an instrument already made next undergone a try then analyzed in order to know validity, consistency internal, and reliability the instruments. From the explanation above, so the purpose of this research is to see if an instrument to be used in research was already feasible or not to get data research.
2. Materials and methods
This study was conducted to their student’s public elementary schools in Surakarta, there are 292 of public school, which then taken 6 of public elementary school as a research based on classifications. Technique the sample collection in this research by means of stratified cluster random sampling. The implementation is carried out by taking the data on the average National Examination in all Public Elementary Schools in Surakarta. This value is sorted from the largest to the smallest. Furthermore, the sequence is grouped into three groups of high, medium and low. A Population schools are grouped into three categories, namely high, medium, and low, then from each selected school three classes are randomly selected, then a balance test is performed. After obtaining three balanced classes, then the three classes are made into samples divided into three experimental classes in each school.

The instrument of this study is a questionnaire learning style with 66 items consisting of 22 points of statement for each questionnaire of visual, auditorial, and kinesthetic learning styles and learning creativity consists of 48 items. The feasibility test of questionnaire instrument learning style and learning creativity consists of validation, consistency, instrument grain determination, reliability. Meanwhile, feasibility test of questionnaire instrument using content validity. Validator for both questionnaires is expert judgment. There were 60 students as respondents who tested the learning style questionnaire instrument and 64 students as respondents who tested the questionnaire instrument of learning creativity. The feasibility study of the learning style questionnaire indicates that there are 45 eligible items consisting of 15 items of statement for each questionnaire of visual, auditorial, kinesthetic learning style and a learning style questionnaire indicating that there are 35 items that are eligible to be used based on testing and some revisions of expert judgment.

3. Results and discussion
Before instruments used for data collection learning style and creativity student learning, so an instrument already made next undergone a try then analyzed in order to know validity, reliability, and consistency internal the instruments.

3.1 A test the validity of the contents of
Work to assess where support for violent attacks had the validity of other of any economic indicators a lot of content essentially and perfectly morally good, usually done is through expert judgment (the assessment conducted in by the scientists).

3.2 Consistency internal
To know correlation grains about chief used formula correlation moment the product of karl pearson as follows:

$$r_{xy} = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{(n \sum x^2 - (\sum x)^2)(n \sum y^2 - (\sum y)^2)}}$$ (1)

3.3 Reliability test
Reliability test using formulas alpha:

$$r_{11} = \frac{n}{n-1} \left(1 - \frac{\sum_{i=1}^{n} s_i^2}{s_e^2}\right)$$ (2)
3.4 learning style
Chief arranged by researchers this is chief closed consisting of 22 items of statement for learning style visual, auditorial, and a kinesthetic. After undergone a try an instrument, the results that an instrument chief learning style set to withdraw the data consists of 15 grains statement for learning style visual, auditorial, and a kinesthetic. The following the results of the tryouts instrument.

3.4.1 A test the validity of the contents of
Heck the validity of the contents of the other of any economic indicators learning style cooperation and creativity among covering the aspects of this to deliver the material was, be affected by the constructions test and a language test. Check these were done in by the use of sheets of the validity of the contents of the three people validator, promised to supply Pratista Arya Satwika, S.Psi., M.Psi., Psi., and Arif Tri Setyanto, S.Psi., M.Psi., Psi. Which have been a psychology lecturer Universitas Sebelas Maret, and then Dr. Wagimin That is lecturers guidance and counseling Universitas Sebelas Maret. The validity of the all items about validator stated that they were appropriate criteria.

3.4.2 Consistency Internal
In terms of consistency internal, grains chief used to collect the data learning style is grains statement that has the consistency of internal good, namely by $r_{xy} \geq 0.30$. 

![Figure 1. Research flow](image-url)
3.4.3 Reliability test
Each other of any economic instruments pertaining to retail and that is used to collect the data learning style the students were have an abundance of energy $r_{11} \geq 0.70$. Based on the calculation on obtained reliability index provided the global financing for the style of study visual as much as 0.84, the style of study auditorial as much as 0.80, and of a kinesthetic learning style 0.81.

3.5 Learning Creativity

3.5.1 A test the validity of the contents of
Validity used use experts the people of in his work and obtained 48 grains an instrument testing meet the criteria valid.

3.5.2 Consistency Internal
Based on the calculation on the consistency of other of any economic indicators in accordance with its internal creativity learn from 48 of the grains of instrument being worthy of being used over 35 other of any economic indicators of the grains of that are consistent because it fulfilled the criteria for $r_{xy} \geq 0.30$.

3.5.3 Reliability test
After determined 35 grains an instrument which will be used. Based on the calculation on chief reliability creativity learn obtained index of 0.88. It showed that an instrument chief creativity student learning meet the criteria reliabel.

4. Conclusions
From the results of the discussion on the above, obtained drawing conclusions as follows: (1) learning style consisting of 22 an item of statement for a style of study visual, auditorial, and a kinesthetic. After the event was done a pilot project on an instrument, the results showed that each other of any economic instruments pertaining to retail and learning style which have already been stipulated to the uptake data consists of 15 grains of of statement for a style of study visual, auditorial, and a kinesthetic, while the creativity of other of any economic indicators key insight about learning from 48 of the grains of instrument of being worthy of being used over 35 of the grains of; (2) each other of any economic instruments pertaining to retail and of being worthy of being used with some a revision of expert judgement.

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