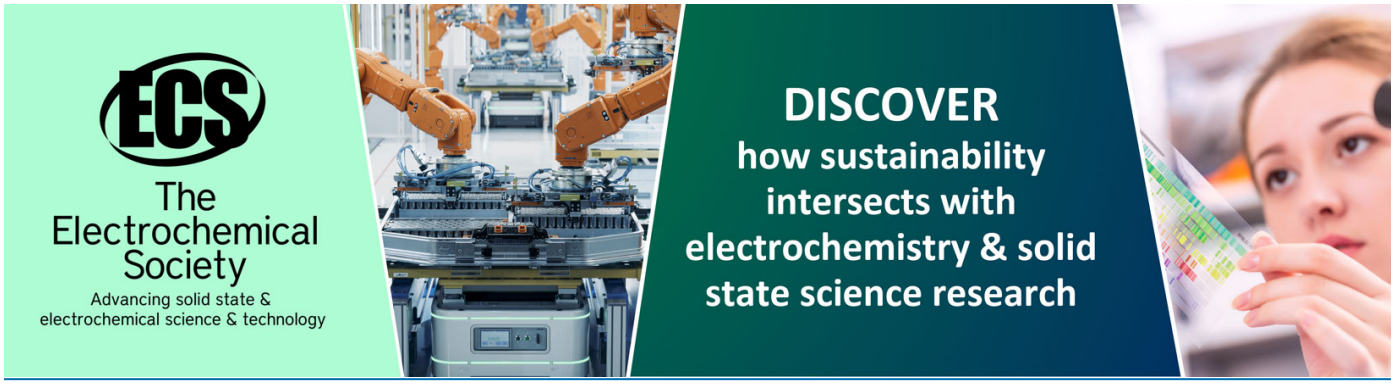
Students' responds in using Beboo to learn Static Fluid concept



Students' responds in using *Beboo* to learn Static Fluid concept

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Abstract. *Beboo* is a bilingual (English-Indonesia) interactive e-Book with virtual laboratory feature. *Beboo* has been developed in Static Fluids Concept for teaching package. It contains many contents like pressure, hydrostatic pressure, Pascal law, Archimedes law, capillarity, viscosity and surface tension. In experiment process, this e-Book supports the virtual laboratory, U-Pipe system. *Beboo* is designed to succeed the international program in senior high school level in Indonesia as the learning source. Twenty-four students have been used *Beboo* in the classroom. This particular research explored the student responds to this e-Book. Students have been tried the U-pipe virtual laboratory and determined the density of the fluid from that activity. As the result, students found *Beboo* to be a positive learning experience with all the content, language, media and learning aspects state in a good and very good category. It means the student can use and simulate the experiment to determine the density of the fluid. However, students have a problem in language aspect. The data showed this aspect state in lowest respond percentage (73%) than others.

1. Introduction

In instructional process, learning source is important to increase the students' information about particular physics concept. In real life, the application of physics concept is numerous. Students will gain wider range in physics concept understanding with inform the relationship between that concept to familiar experience [1]. As the Vygotsky says a good concept is achieved when the physics concept and everyday experience have merged [2]. It means a good learning source must be containing physics concept application in everyday life. From several physics' concepts, static fluid is a part of fluids mechanics and discuss about liquids and gases at rest [3]. This concept consists of pressure, hydrostatic pressure, Pascal law, Archimedes law, capillarity, viscosity and surface tension. In daily life, many applications of this concept can find easily. As example, a drinking process with straw-using applied the hydrostatic and air pressure [4]. Besides, any technology such as hot air balloon, ship, submarine, hydraulic jack and hydraulic brake system use Archimedes and Pascal law [3].

For better students' concept, they need do some experiment. Students should learn by demonstrate a concept or design an experiment with scientific process [5]. In scientific process, students will observe the daily phenomena relate to static fluids concept as the essential things [6], make some questions to solve, collect some data to answer the question before, analyse the data with graph-making, and conclude the experiment in order to the question before. A whole activity at that process succeed with real laboratory setting and appropriate measurement tools using. In 21st learning process, the real setting can change to technology integration [7].

21st learning process is the processing-orientated activity like problem solving, adapting skills and teamwork [8]. It means, the purpose of the 21st learning process is train the students to real-work condition widely. That condition is caused by the high mobility at the recent time. Besides, 21st learning process face the technology development. In class, the technology-use is the common activity and a tool for study, not as the studying object. Today, numerous learning source technology for learning process is available in any form such as multimedia, simulator and computer-based laboratory.

One of the popular digital media is computer-based laboratory, like PhET Simulation™. The students can explore the experiment setting in virtual. This particular research combines the computer-based laboratory with e-Book called *Beboo*. Besides, *Beboo* have more feature in bilingual (English-Indonesia). This e-Book developed for International Program Class in Indonesia. The other feature is video support which used by students for construct the students' attention. This activity supports the students' learning process with scientific approach.

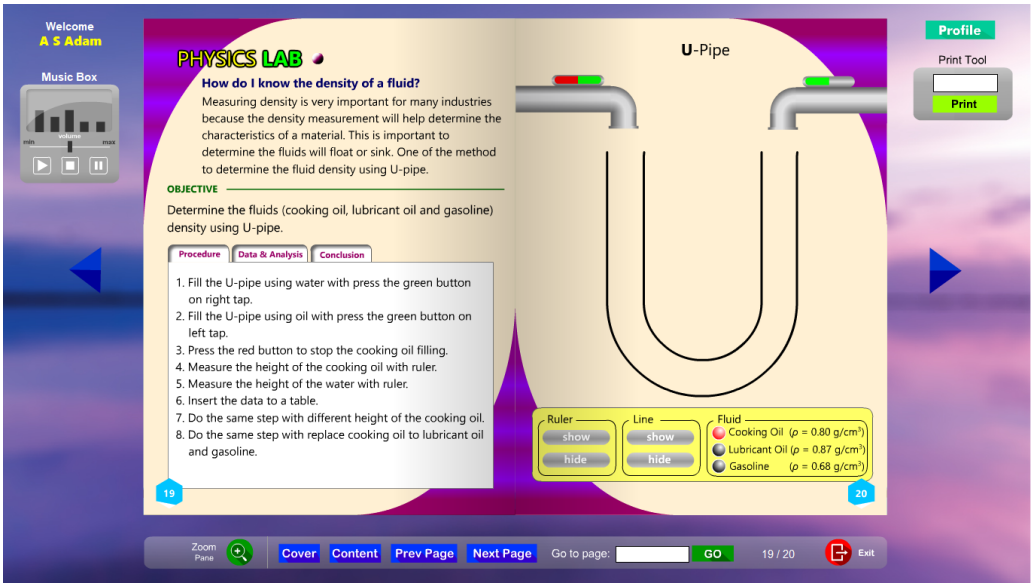

Figure 1. *Beboo* screen showing the U-Pipe Simulator.

Figure 1 shows the *Beboo* screen that simulate the U-Pipe setting. This simulation uses to determine the density of the available fluids (cooking oil, lubricant oil and gasoline). The various frame on this media show the beginning process to measure the height of the left and right side of the U-Pipe. This media also provides with students' activity sheet, make the students do the suitable order in scientific process. This sheet also completes with automatic graph making to show the proportional principle, show aberrant data and gradient analysis to determine the fluids' density [9].

2. Method

2.1. Context and participants

This research uses students' responses data of 24 students in a school with new international class program, MA Bilingual Muslimat NU Sidoarjo (Islamic Senior High School Bilingual Muslimat NU Sidoarjo), Indonesia. Students are typically second-year student at senior high school. These students are in mathematics and natural science program (MIA). The responses are assessed after the teacher use *Beboo* in physics learning process at class. These learning uses scientific process (observe, ask the question, collect some data virtually, analyse the data and conclude the experiment). The *Beboo* using covers the bilingual feature, video about hydrometer, computer-based simulation (U-Pipe) and students' activity sheet.

2.2. Data and analysis

The data sources for these particular studies are students' response based on the students' answer about the *Beboo* experience using in a form. This form consists of four aspects: media, content, language and learning. Media aspect contain the display of *Beboo*, content aspect includes the static fluids matter in understanding convenience, language aspect consists the ease of language understanding and learning aspect contain the scientific process experience in *Beboo* using. More particularly, all aspect develops to 20 questions and 1 open opinion question. The positive responses data result is show in percentage and interpreted to table adapted from Riduwan [10]. Moreover, every aspect is studied in detail.

Table 1. Score interpretation [10].

Percentage	Category
0% - 20%	very less
21% - 40%	less
41% - 60%	middle
61% - 80%	good
81% - 100%	very good

3. Results

The first part of this section is students' positive response about *Beboo* in every aspect by presenting the percentage of every question. The content aspect consists of 5 questions, media aspect contains of 6 questions, language aspect consists of 4 questions and leaning aspect includes of 5 questions. The second part is the analysis of data recapitulation.

3.1. Initial study: Students' response findings

In this part, the positive responses took from the answer in response form and focus on percentage of positive response in every question at all aspects.

3.1.1. Media aspect. This aspect discusses about the visual interface and user's experience of the media, consist of background, navigation, illustration, animation, video, quiz, music to create the students' motivation. The users' experience describes the usability of *Beboo* in everywhere and every time. For this usability, *Beboo* must be in full-featured learning. Students have tried a whole feature and their positive responds show in figure 2.

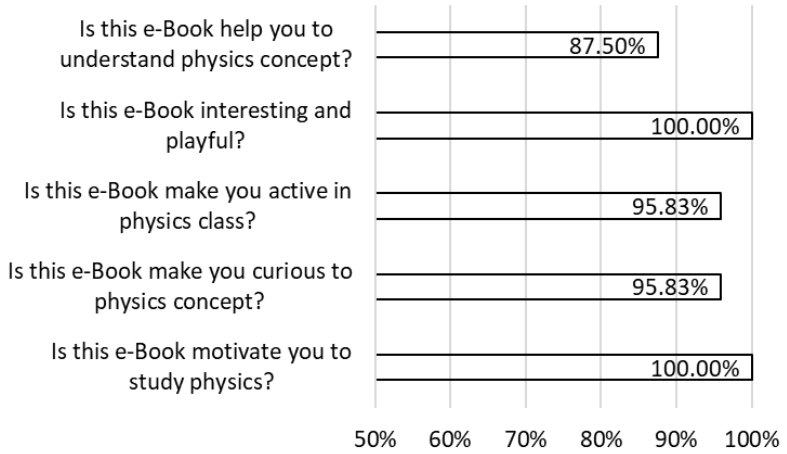

Figure 2. Percentage of positive responds in every question at media aspect.

Based on Figure 2, all the questions state in a very good category. It means after try the whole feature, most of students (more than 83%) think that this e-Book easy to use and has full feature to support the self-motivated learning. It will affect to students to study in everywhere and every time

since the device is available. The quiz feature in *Beboo* can assess the learning outcomes, score will appear immediately after click the check button. This feature can overwrite the peer strategy due to the self-learning strategy. Peer strategy helps the students to check the encountered difficulties in particular material [11]. Besides, the picture, animation and video relate to physics concept in static fluids and help students to understand this matter. Before use this media, students have study the static fluids concept in a past semester. So, students can compare the learning setting between traditional class to *Beboo* using in learning.

3.1.2. Content aspect. This aspect discusses about the matter of *Beboo*. This media contains static fluids content like pressure, hydrostatic pressure, Pascal law, Archimedes law, capillarity, viscosity and surface tension. Based on this matter, there are many phenomena corresponding to static fluids concept. That phenomena can animate clearly, show the regular order of a phenomena. As the example, the Archimedes force $\mathbf{F}_\mathbf{A}$ can be shown by particular arrow, can't observe directly.

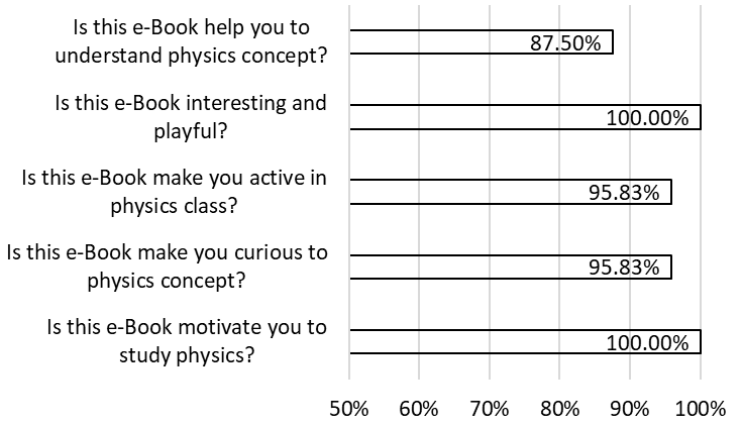

Figure 3. Percentage of positive responds in every question at content aspect.

Based on figure 3, all the question in this aspect state in very good category. It means, after try *Beboo*, most of student (more than 87%) think that this e-Book helps them to understand the physics concept in static fluid chapter. Moreover, students think that this e-Book is playful and interesting, so it creates the motivation and curiousness of students to support the self-learning [11].

3.1.3. Language aspect. This aspect discusses about the language use in *Beboo*. This aspect includes the whole matter of static fluid, the opening part and the language in button and navigation. In *Beboo*, the language developed in two languages, English-Indonesia (bilingual). This feature developed to international class program in Indonesia. After dissolving the international school in state school, the other school still has international class. In this class, physics is delivered in two languages.

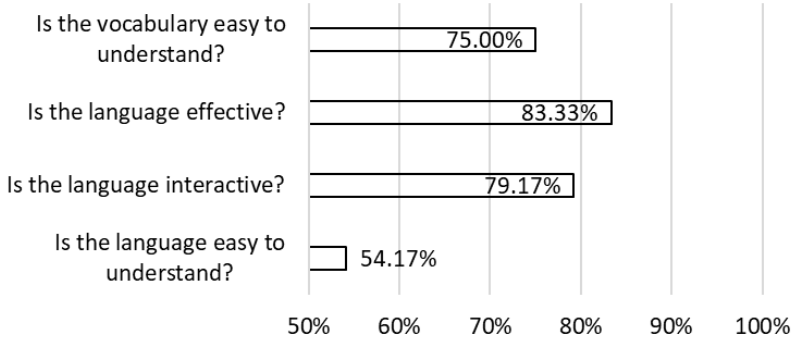

Figure 4. Percentage of positive responds in every question at language aspect.

Based on Figure 4, just one aspect state in very good category, the other three states in a good category. Compared to other aspects, this aspect has the lowest positive responses. It means students have problem to understand the English part. Students can't understand the English part easily, need more attention to deliver the meaning of the particular vocabulary. This problem shows in class clearly, many students ask the meaning of some part in e-Book. Fortunately, this e-Book completes with Bahasa Indonesia. The low percentage of this part doesn't mean the language aspect in *Beboo*, need more than just high-quality media to succeed the bilingual learning in class.

3.1.4. Learning aspect. This aspect discusses about the ability of *Beboo* to support the scientific process in scientific process. Scientific approach is the common issue in Indonesian curriculum. All subject expects to use this approach and construct their own knowledge. Every step in this approach can apply in *Beboo* with many features developed. Students can print their observation layout, question sheet, data sheet and analysis sheet to discuss material with teacher or other students.

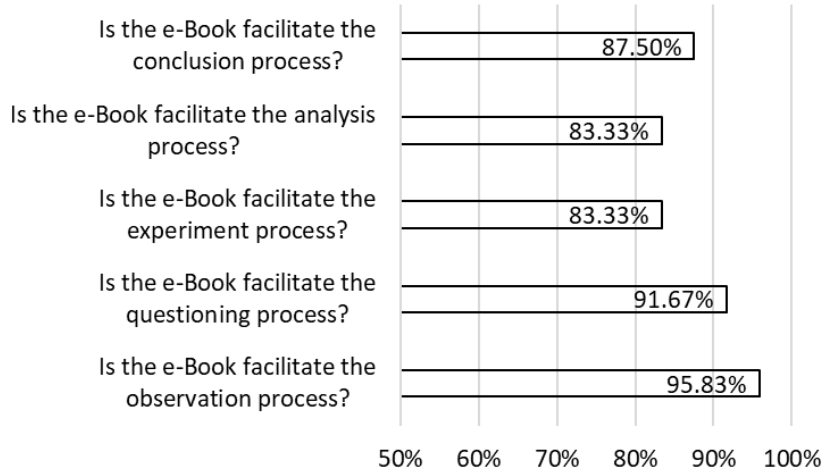

Figure 5. Percentage of positive responds in every question at learning aspect.

Based on Figure 5, all the question state in very good category. It means most of students (more than 83%) have positive responds of *Beboo* in this aspect. Students has used *Beboo* in scientific approach setting and think that this media support that approach. This show that at whole learning activity in this approach need only one media, more effective in time.

3.2. Analysis

The positive percentage responds in all aspect is compiled to Figure 6. This figure shows the students' responds of *Beboo* using to learn static fluid concept. Based on Figure 6, the content, media and learning aspect state in very good category. This mean most of students (more than 88%) can use the simulation to determine the density of the fluid, cause positive perception about computer-based learning. It indicates that they agree that instructional process in class integrate with technology because of their ability to use electronic learning source. At common era, technology is the tools to learn contextual phenomena, find interesting fact about some environmental problems, solve that problem and work in social community [12].

All three-positive response also depend on the quality profile of the media. The content and media aspect have more than 90% of positive responds. It means students have interesting to animation and illustration in *Beboo*. Furthermore, these visual objects have valid from the expert lectures and appropriate to physics concept.

Basically, *Beboo* is bilingual interactive e-Book, but it completes with virtual simulation, makes it became the one package teaching material with scientific approach support. The similar media should be developed in another chapter or other subject, because of the students' response about this media.

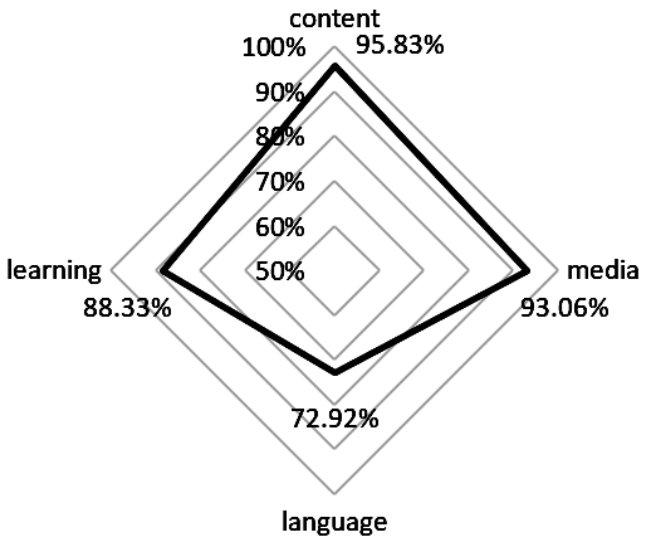

Figure 6. Percentage of positive responds in every aspect.

From other aspect, language has the lowest percentage. This low score caused by English part of the media. In certain part, *Beboo* didn't complete with Indonesia translation, cause the confusion in students specially in physics vocabulary (language adaption). In particular vocabulary, there is no appropriate meaning from Indonesia to English or vice versa. In the other side, validating process of this media has high score of language structure. This indicate that need more than good language structure to make students more proficiency to use the bilingual media.

For proficiency *Beboo* or bilingual learning source using, students need the improvement on language skill. Students should be use bilingual media as often as possible. They need trained to make English-Indonesia translation and special term in physics. This improvement should be supported with make a special program for international class program. Not only for students but also teachers in that school should make improvement in language too.

In future, *Beboo* should be completed with Indonesia translation in all part, not only in matter part but also in student's activity sheet, quiz and review. Besides, the special-physics vocabulary should be introduced in advance and should be added by the glossary in this media.

4. Conclusion

The students' responds in using *Beboo* has to be a positive learning experience with all the content, language, media and learning aspects state in a good and very good category and percentage in 72%-95%. It means the student can use and simulate the experiment to determine the density of the fluid. However, students have a problem in language aspect. The data show this aspect state in lowest respond percentage (73%) than others. For common development, need a students' language improvement and complete *Beboo* with glossary.

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