A blended learning with social media in computer-aided drafting courses

A Nuryanto, Pardjono, Y Ngadiyono, Y Nugraha and Z Rofiq
Department of Mechanical Engineering Education, Universitas Negeri Yogyakarta, Indonesia
E-mail: apri_nuryanto@uny.ac.id

This study aimed to determine the effect of the blended learning model with social media on learning outcomes of computer aided drafting (CAD). The method used in this quasi-experimental study was a non-equivalent control group design. The research sample consisted of two groups, namely the control and experimental groups. The experimental group is treated by applying the blended learning model with social media in CAD courses, while the control group uses conventional learning methods. Data collection techniques used were observation, questionnaires, and documentation. The results of this study indicate that the blended learning model in CAD learning can be done face-to-face in the form of lectures, questions and answers, demonstrations and assignments, and online in the form of uploading teaching materials in the form of materials, sample videos, discussion forums, assignments, and assessment. Learning outcomes using the blended learning method with social media increased by 29.2%, and the average value was higher than conventional learning. The blended learning model with social media significantly affects CAD learning outcomes (t= 7.06 and Sig. 0.000 <0.05).

1. Introduction
The Computer-Aided Design (CAD) course equips students to have the competence to produce mechanical drawings with computers [1]. The learning material includes CAD systems, creating basic sketch shapes, basic 3D modelling concepts and making working drawings directly from 3D models, image representation, modifying image entities, displaying images with projections, creating view drawings, providing image sizes and annotations, designation of tolerances, customization and surface configuration, drafting and manufacturing of working drawings according to ISO standards, advanced 3D modelling and design, designing a component and placing work features, assembling components, creating assembly drawings and 3D drawing presentations. After completing this course's achievements, students are expected to have the competence to create and present 3D model drawings and 2D work drawings. Evaluation is carried out through written tests, structured assignments, and student participation in the class [2].

Based on the observations so far, the lecture process is still conventional, where the delivery of information is mostly conveyed by lecturers so that students passively receive the information provided. Also, learning is still very theoretical, and students only do practical assignments according to the given job sheets [3]. The material given is also not applicable to the realities in the work field. Lessons that are only lectures with a little demonstration are sometimes boring for students [4]. Besides, CAD courses that require assignments in the form of files will be a bit of a pain for the lecturer in file management.
For example, there are 12 jobs during the semester, and in one class, there are 40 students; it can imagine that there are so many files that have to be corrected. So far, file collection has been done by using email and a copy from the flash disk. This collection process will also experience problems, for example, a file is infected with a virus, and if it is via email, it will take a long time to download and manage the file [5]. Constraints in the process of collecting this file will affect the assessment process for each student assignment.

The use of other media in CAD lectures has not been done optimally. The media used are also not diverse, especially if students are going to study independently and are not well accommodated [6]. The use of online learning media has also not been done well [7]. In addition, the method used still tends to be monotonous, namely only by giving a few examples, and after that, students do the assignment. Learning patterns like this must be improved so that the implementation of CAD courses is better. The use of information and communication technology (ICT) has not been implemented optimally so that learning can be more optimal to affect student learning outcomes [8].

ICT in learning is used to access material, administrative systems, online assessments, sharing information, online meetings, online tutoring, online libraries, and so on. ICT can also combine face-to-face learning and learning outside the classroom, or even with ICT, can replace live courses into an online system [9]. This learning model is known as blended learning, where this learning combines face-to-face and virtual learning. Blended learning means a mixture or combination of learning or a combination of face-to-face and online learning elements in an ideal harmonious manner. Blended learning model learning is not thoroughly carried out online and replaces face-to-face in class, but complements materials and materials that have not been conveyed to students [10]. Blended learning as a learning program in which more than one delivery model is used to optimize learning outcomes and program costs [11]. Blended learning should be viewed as a pedagogical approach that combines the effectiveness and opportunities of socializing classrooms with the possibility of technologically enhanced active learning from an online environment [12].

Many things can be used to implement the blended learning model, social media use. Why should social media be used? This social media is an online media widely used by its users to communicate, create forums, create material content, and various information that can be accessed simultaneously with broad coverage. Social media has significant potential if used to help the learning process be more efficient, easy, and fun. Several existing social media, such as Facebook, Twitter, blog, WhatsApp, YouTube, etc. Facebook social media can function for sharing communication, a means of discussion, self-development in building relationships, media for social interaction, self-expression, entertainment, media promotion, and social control, which is very helpful for the learning process—such as Nuryanto research examined the use of Facebook social media to improve teaching competence in microteaching subjects [6]. Video recorded teaching Facebook group uploaded, commented on, and assessed together online on Facebook. This model of using social media Facebook like this effectively improves students' teaching skills as prospective teachers.

There is still very little research on the application of social media for learning. On the other hand, there are still many potentials that can be explored more in-depth. The blended learning model using social media, especially for CAD learning, has not been widely studied. Therefore, it is necessary to examine how blended learning with social media affects CAD learning outcomes.

2. Method
When viewed from its use, this research is included in applied research, namely research that aims to increase scientific knowledge with practical purposes. When viewed from the method, this research is included in the type of experimental research. The study was conducted to find a blended learning model with the best applied social media. This research is included in experimental research, with quasi-experimental and using the experimental design model nonequivalent control group design. This research was conducted in two selected class groups. The two classes selected were one as the experimental group and one class as the control group. The experimental group used threat X, and the
control group received no treatment. A pretest and posttest were performed on both groups, and a different test was performed on both of them.

The research subjects are all students who, in the even semester 2019/2020, are taking CAD courses. From the available data, there are two classes taking CAD courses. The number of samples for the experimental class was 16 students, and for the control class, there were 18 students. With the nonequivalent control group design method, the sample selection was not made randomly. The data obtained in this study are in the form of student response data to the blended learning implementation model using social media in CAD courses and data to draw competencies with CAD. The data collection techniques used were observation, tests, questionnaires, and documentation.

The data obtained were analyzed and used to answer the predetermined research questions. The quantitative analysis was carried out through a different test from the pretest and posttest results. The pretest score was obtained from the students' initial scores in both groups. The posttest score is obtained from the student's final score. The pretest and posttest results were used to compare the two groups to get the best experimental results. The validity value is seen from the difference test between the two selected classes. The effectiveness value is seen from different tests between the two classes that received different experiments.

3. Results and Discussions
Blended learning with social media help is a CAD learning media development that should be tested from the start of selecting to its effectiveness. This research will explore several aspects to answer the research formula.

3.1. Reasons for choosing social media
Analysis in the use of social media in CAD learning considers several things, including 1) it can be used to make groups more private, 2) can be used for communication forums, 3) can be used to upload materials, videos, and assignments from both lecturers and students, 4) can be used to upload assessment results, and 5) easily accessible with various devices. Based on learning needs, suitable social media is chosen, namely Facebook (FB) (table 1).

| Criteria                              | Twitter | Facebook | Blogs  | Wikis  | Skype | google doc |
|---------------------------------------|---------|----------|--------|--------|-------|------------|
| Ease of use                           | Easy    | Easy     | Easy   | Enough | Easy  | Enough     |
| Ability for interaction               | Easy    | Easy     | Enough | Enough | Easy  | Enough     |
| The ability to support video and image media | Can not | Can      | Can    | It is hard | Can  | Limited    |
| Ability to upload files               | Can not | Can      | Can    | It is hard | It is hard | Can    |
| Ability to create groups              | Can     | Can      | Very difficult | There is no | Can  | It is hard |
| Support access to various media (such as computers and cell phones) | Can | Can | Limited | Limited | Limited | Limited |

3.2. Blended learning model with social media
The blended learning model with social media for CAD courses is presented in figure 1. In general, the blended learning model with social media is face-to-face in lectures, questions and answers, demonstrations, and assignments. In online learning, upload teaching materials in the form of materials, sample videos, discussion forums, and submitting assignments and assessments.
3.3. The effectiveness of blended learning with social media on learning outcomes

The pre-test and posttest calculation results in the experimental and control groups are presented in table 2. The average for the pretest score is 65, and the posttest score is 79. The maximum score for the pretest is 76, and the maximum value for the post-test is 89. From this data, it can be seen that in general, it has showing improved results, although not so satisfying.

### Table 2. Calculation of the pre-test and post-test

| Results                  | Pretest | Posttest |
|--------------------------|---------|----------|
| Average                  | 65      | 79       |
| Standard of Deviation     | 5,43303065 | 5,698062341 |
| Min                      | 52      | 70       |
| Max                      | 76      | 89       |

The average increase in the experimental group from 64.7 to 83.6 was 18.9 (29.2%), and in the control group from 64.4 to 75.5, it increased by 11.1 (17.23%). Based on these results, the experiment was able to increase learning outcomes by 29.2%, which was greater than the experimental group, which was only 17.23%. After obtaining descriptive quality results, the analysis process was continued on the independent sample test. This test is a parametric statistical analysis used to test whether there is a difference between the two unpaired data groups. The independent t test results for N gain score using SPSS 23 series presented in table 3.

### Table 3. Independent sample t-test in the control and experimental groups

| Group       | N   | Mean   | Std. Deviation | Std. Error Mean |
|-------------|-----|--------|----------------|-----------------|
| NGain_persen| Experiment | 16  | 53.4438 | 8.45290         | 2.11323         |
| Control     | 18   | 30.5044 | 10.26140 | 2.41863         |

Based on the data processing results above, the mean for the experiment is 53.4438, and the control is 30.5044. The control group results were included in the ineffective category, and the experimental group was in the less effective category. So it can be concluded that the blended learning model with social media is less effective for improving CAD learning outcomes, and the conventional model is not effective for improving CAD learning outcomes. From this statistical description, it can also be concluded that there is a difference in the blended learning model's effectiveness with social media and the conventional model in improving CAD learning outcomes. The difference between the two models' effectiveness was tested for significance by using the independent sample test. The data from the independent sample test results are presented in table 4 below.
Table 4. The results of the independent sample test

| NGain_person | Levene's Test for Equalities of Variances | t-test for Equality of Means | t-test for Equality of Means |
|--------------|-------------------------------------------|----------------------------|----------------------------|
|              | F  | Sig. | t     | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Equal variances assumed | .256 | .617 | 7.060 | 32 | .000 | 22.93939 | 3.24929 |
| Equal variances not assumed | 7.142 | 31.836 | .000 | 22.93939 | 3.21178 |

Based on the test results, it is known that the significance value (Sig) of the Levene's Test for Equality of Variances is 0.617 > 0.05, so it can be concluded that the N-gain data variance (%) for the experimental class and control class is the same or homogeneous. Thus the independent t-test for the N-gain score is guided by the Equal variances assumed. The t-test results obtained 0.000 < 0.05. Thus, there is a significant difference in effectiveness between the blended learning model with social media and the conventional model in improving CAD learning outcomes.

4. Conclusions

Based on the results of research and discussion, it can be concluded that the blended learning model with social media in CAD learning is carried out with preparation, implementation, and evaluation. CAD's learning outcomes with the blended learning method with social media increased by 29.2% (from 64.7 to 83.6), more significant than conventional learning, which only increased by 17.23% (from 64.4 to 75.5). The blended learning model with social media has a significant effect on CAD learning outcomes compared to conventional learning models (t = 7.06 and Sig. 0.000 < 0.05). The suggestion from this research is that the blended learning model with social media in CAD courses can improve learning outcomes better than conventional ones so that CAD teachers can use the models that have been found. The research findings that have been found can enrich the existing learning process to be used as a new learning model.

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