Utilization of Barcodes for Process Efficiency Recap Assignment Grades

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Abstract

One of the learning processes is to give assignments to students with the aim of increasing students' understanding of the material that has been given, besides that assignments can also be used as an evaluation tool for whether students have understood the material. The obstacle faced by lecturers is the process of checking and recapitulating the value of the assignment, where the value of this assignment will also affect the final score of students. Many lecturers use excel to record the value of this assignment, but this process still takes time, especially if the number of students is quite large. The purpose of this research is to create an application with the help of barcodes to help lecturers facilitate the process of recording assignments, by using this barcode the process of finding student numbers will be very easy and fast. The working principle of this application is, students include their number on their respective assignment sheets in the form of a barcode, then after the assignment is checked and given a grade, the lecturer scans the student ID using a barcode scanner, the application will look for the student ID and the lecturer just enters value, with this system the process of recapitulating tasks will be fast and accurate.

Keywords: Barcode, Efficiency, The process of recapitulating the value of the task

1. Introduction

Lecture assignments are one of the tools to support the teaching and learning process given by lecturers, because by giving assignments to students, lecturers can measure whether the material that has been given can be understood by students, besides that assignments also function to hone students' abilities in solving problems. The more lecturers give assignments, the more experience and the students' abilities will increase. The value of coursework is also one of the value components that affect the final grade of the course, so the more often the lecturer gives assignments, the more the obligation to check and recap the assignments that must be done by the lecturer. Therefore, we need an application that utilizes barcodes to search for student IDs in the database which will help the process of recording grades become faster, more effective and accurate.

2. Research Methodology
2.1. State of the Art

By applying lecture assignments in material enrichment, it turns out to have many benefits, both for students and for lecturers. Where through assignments from students, lecturers find technological developments from the material being taught which was not previously known by the lecturer, so that it will spur lecturers to further develop the material being taught. In addition, from the student side, it can increase the level of self-confidence of students [1], and eliminate the attitude of procrastination [2] if the lecturer gives a deadline for collecting assignments, besides that students are taught to always look for other sources other than the material provided. by the lecturer [3], besides that there are some students who help

teach their friends if they can't do the assignments from the lecturer [4] which will indirectly make students understand more about the material, and no less important students are also taught not to do plagiarism in doing their work [5].

The problem that occurs by giving assignments to students is the process of recording the value of the assignment which takes quite a long time, because the lecturer has to find the student number and name from the list of student names to record grades, but this problem can be solved with a barcode, where the barcode has been applied in the sales process at supermarkets and also developed for inventory [6], for book savings and loan transactions in libraries [7,8] and for student attendance processes [9,10,11], where by using barcodes all these processes can be done faster and efficient.

2.2. Barcode

Barcode is a set of codes in the form of lines, each line thickness is different according to the character it represents. This barcode will usually be affixed to the label and then affixed to the product it will represent or printed directly on the product to identify the product. The information contained in the barcode can be in the form of serial numbers, model numbers, production codes, identity numbers and others so that they can be easily and quickly identified by the computer system.

To be able to read and translate these barcodes into characters recognized by humans or computer systems, we need a tool that we usually call a Barcode Scanner. Currently there are also many smartphone applications (smartphones) that can read or translate these barcodes through their cameras.

Along with its development, many types of barcodes or barcodes are available in the market. Even the barcodes that we know today are not only in the form of bars, but also in the form of small boxes which are generally square. Below are some types of Barcodes that we can choose according to our use and needs.

2.3. System Block Diagram
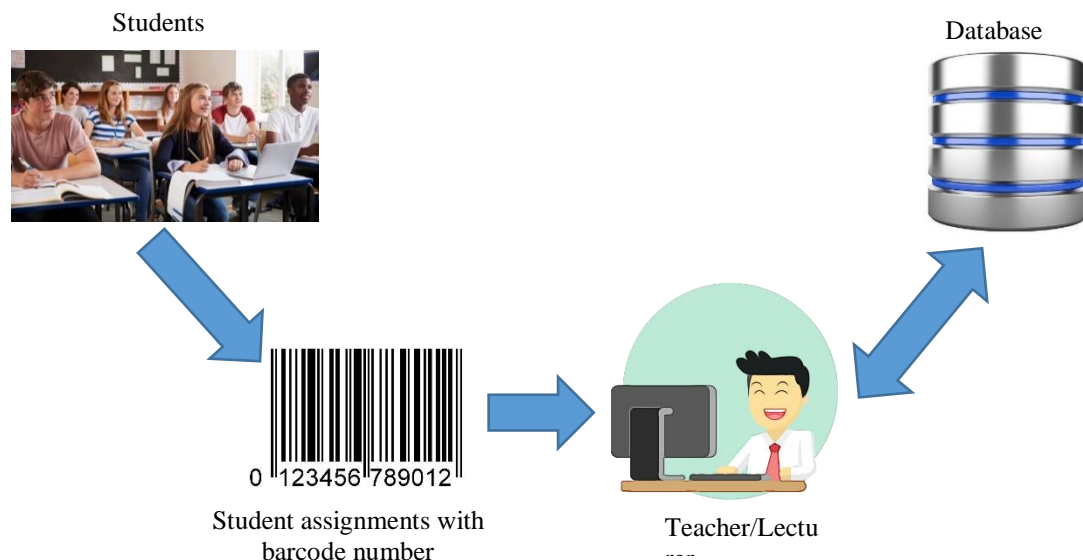
Figure 1. System Block Diagram

In Figure 1, it can be seen that the process of the system is, in which students collect their assignments by using a barcode to replace their identity or identification number which is printed on the task header, then by the teacher or lecturer the assignment is assessed, then in the process of recapitulating the value of

the assignments. they are lecturers or teachers using a barcode reader, by scanning the student identification number in the form of a barcode, the program will search the student data database, after the student data is found, the lecturer or teacher enters the grade of the assignment on the student.

2.4. Assignment submission header format
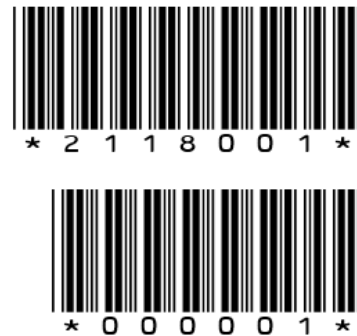
Figure 2. Assignment Header Format

Figure 2, is an example of a header from an assignment that is collected by students, the header consists of the student or student ID number, then the 1st assignment, and the student's full name. To print the NIM and the 1st task using the barcode font, in printing this barcode font it is necessary to pay attention to the font size, the recommended font size is 14.

2.5. Flowchart

Figure 3, is a flowchart of the system created, starting with the lecturer or teacher opening the application, then choosing from the menu, which subject will be graded, if the course is not already in the database, it must be added first, then enter the student database form. to enter the names of students taking the selected course, after all the data of students taking the course have been entered, then enter the task entry grade menu, on this menu the teacher or lecturer needs a barcode reader, but if it does not have a barcode reader, teacher or lecturer can use the keyboard to enter the NIM and the Xth task manually ends with the enter key.

When the scanning process uses a barcode, first the lecturer or teacher scans the student's NIM, then the application will search for the student's data into the database, if the student is not registered a notification will appear that the student is not registered, so the teacher or lecturer must enter data from the student, if the student is found, the second step is to scan the barcode in the second line which is the code for the assignment, after that the lecturer or teacher is asked to enter the grade of the assignment, after the value entry process, the application will save the grade to the database, to record grades from other students, the teacher or lecturer returns to scanning the NIM of the next student, and so on until all grades of assignments are recorded in the database.
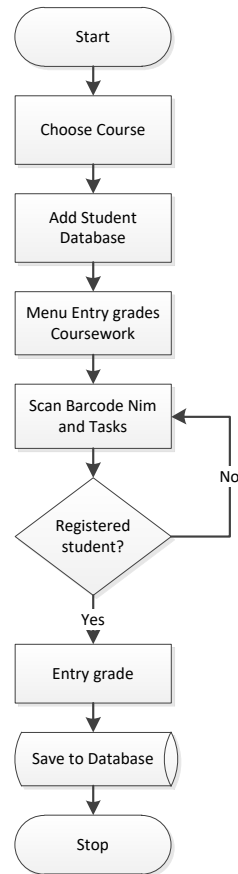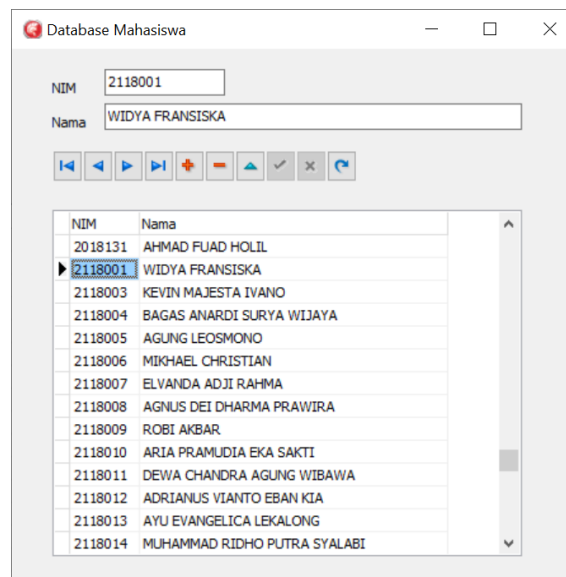
Figure 3. Classwork Grade Storage Flowchart

3. Results and Discussion
3.1. Student Database Form

Figure 4, is a form for student list entry that will be used in the score recording process. All students must be included in this list, because later data from these students will be used as participants for each course.

Figure 4. Student Database Form

3.2. Student Data Entry

Figure 5, in this form the teacher or lecturer can enter a list of students from each course, with data for the academic year, semester and course, after selecting these parameters, the teacher or lecturer is asked to enter a list of students taking the course.
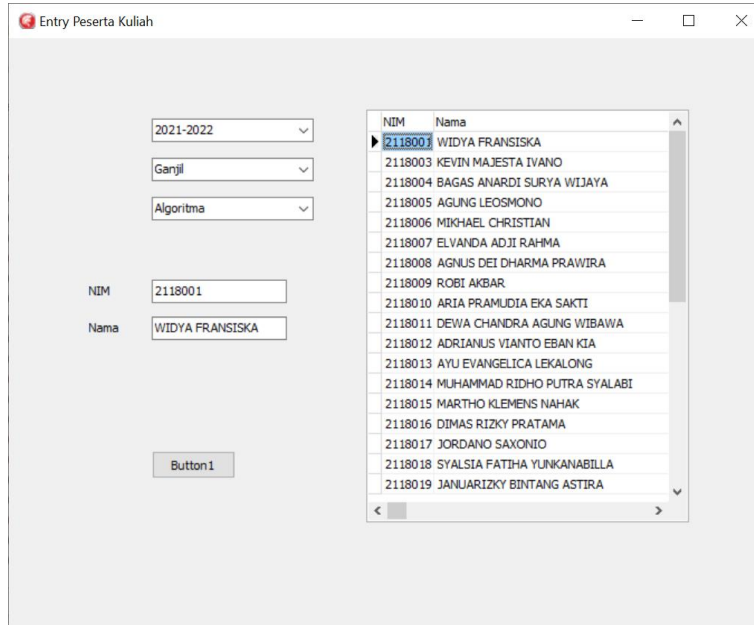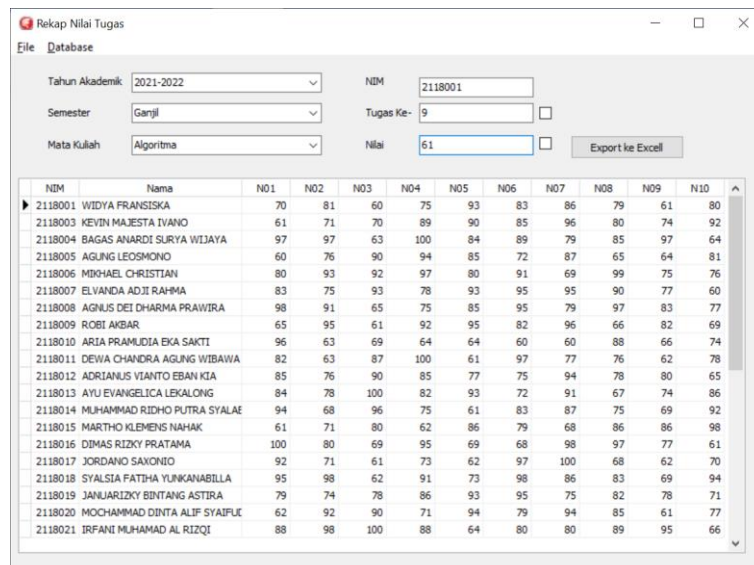
Figure 5. Student Data Entry Form

3.3. Assignment grade entry form

Figure 6, with the help of a barcode reader, the teacher or lecturer scans the student's NIM that has been printed using a barcode font, the scanned data will be placed on the NIM entry menu, the next step is to enter the xth task data by scanning the barcode font for the th assignment. x from the student's answer sheet, after doing this the program will ask to enter the grade of the student's coursework

Figure 6. Assignment grade entry form

3.4. Export to Excel

Figure 7, after the grade recording process has been completed, the teacher or lecturer can export the value data into an excel file, in this file the teacher or lecturer can enter formulas to get the final score for each student

Figure 7. Export to Excel

3.5. Barcode Reading Test Results

Table 1 shows the test results of barcode reading with various sizes and colors and using two types of printers, namely inkjet printers and laser printers. easily by a barcode reader, while testing using an inkjet printer, fotm barcodes in blue and red are also read well using a barcode reader.

Table 1. Barcode Reading Test Results

No	Barcode	Criteria	Scan Barcode	
			Inkjet Printer	**Laser Printer**
1		Font Size: 8 Color : Black	Not successful	Succeed
2		Font Size: 10 Color : Black	Not successful	Succeed
3		Font Size: 12 Color : Black	Succeed	Succeed
4		Font Size: 14 Color : Black	Succeed	Succeed

No	Barcode	Criteria	Scan Barcode	
			Inkjet Printer	**Laser Printer**
5	‖‖‖‖‖ *2118001*	Font Size: 12 Color : Blue	Succeed	-
6	‖‖‖‖‖ *2118001*	Font Size: 12 Color : Red	Succeed	-

3.6. Assignment Score Recording Speed Test

Figure 8, shows the comparison results of recording grades manually and using the help of a barcode reader, the test results of recording grades from 20 students can be seen if the teacher or lecturer using a barcode reader takes twice as fast as calculating grades manually.
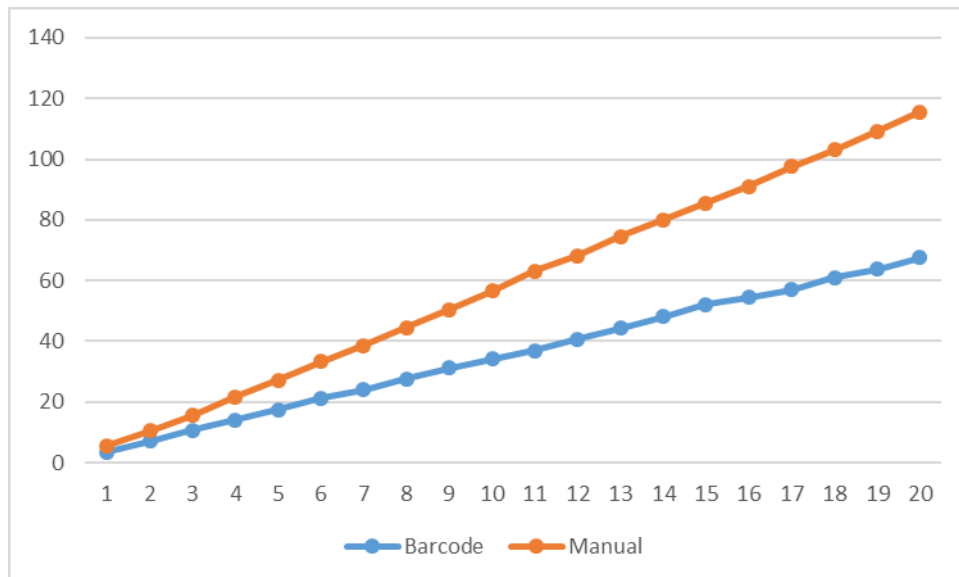
Figure 8. Manual and Barcode Comparison

4. Conclusion

The simulation results show that the recording of coursework grades will be faster with the help of Barcodes, printing barcodes is very easy by using barcode fonts, printing barcodes is better with a fairly large size if using a printer whose resolution is not too good, the results of barcode printing will be better and easier to read if using a laser printer.

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