Teaching Tip
Detecting Plagiarism in MS Access Assignments

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ABSTRACT

Assurance of individual effort from students in computer-based assignments is a challenge. Due to digitization, students can easily use a copy of their friend's work and submit it as their own. Plagiarism in assignments puts students who cheat at par with those who work honestly and this compromises the learning evaluation process. Using a new feature called data macros, this paper showcases a parsimonious method to detect plagiarism in MS Access assignments that can be easily used by instructors to identify and document plagiarism in assignments.

Keywords: Database management systems (DBMS), Assessment, Pedagogy, Plagiarism, Computer assisted education

1. INTRODUCTION

Plagiarism in assignments and tests is pervasive in universities (Etter, Cramer, & Finn, 2006; Jones, Reid, & Bartlett, 2005; Molnar, Kletke, & Chongwatpol, 2008) and therefore tackling plagiarism is critical (McLafferty & Foust, 2004). While instructors can demand paper-based tests/assignments in non-technical courses, digital submissions are often necessary when work using technology such as spreadsheets or databases is being evaluated. Digital submissions, however, make it easier for students to plagiarize. All a student needs to do is make a copy of a completed assignment and submit it as his/her own. The challenge for instructors lies in not only detecting plagiarism but also obtaining digital proof of plagiarism. While many commercial tools such as Turnitin (Chao, Wilhelm, & Neureuther, 2009) and SafeAssign enable instructors to check for commonality among submissions, they are ineffective when the answers are expected to be the same. Furthermore, such tools are primarily intended for detecting plagiarism in MS Word or text documents. They do not work with other formats such as Microsoft Access that are not textual in nature (McCart & Jarman, 2008).

To address plagiarism in non-text format, researchers have attempted to create detection tools specific to each technology. For example, Singh, Mangalaraj, & Taneja (2012) used Macros to detect plagiarism in MS Excel assignments; McCart & Jarman (2008) tested the effectiveness of a technological tool developed in Visual Basic for Applications that compared database properties to look for plagiarism in MS Access assignments; Joy & Luck (1999) compared lexical content and structural content to detect plagiarism in source code of programming assignments.

This paper showcases a simple method that relies on data macros, a new feature in Microsoft Access 2010, to detect plagiarism in MS Access assignments. The method proposed in this paper is simpler when compared to the one proposed by McCart & Jarman (2008) in two ways. First, this method relies on digital watermarks implicitly created by the user and hence allows common data object names and database properties in assignments; this is useful when the instructor expects the same response from the students after they perform a set of tasks. Second, this method does not need dedicated software to detect plagiarism; it simply relies on built-in features of MS Access to provide evidence of plagiarism.

2. ARTIFACT

Microsoft Access 2010 is a relational database system with a graphical user-interface. This version has many new tools such as data macros that can be leveraged to make powerful databases. Being part of Microsoft Office, Microsoft Access 2010 is readily available to instructors and is used widely to introduce students to database concepts (Adams, Granger, Goelman, & Ricardo, 2004). Data Macros are available in Microsoft Access 2010 and 2013.

3. METHOD

This section describes, with an example, the proposed method of detecting and documenting plagiarism. Students are given a pre-populated database containing many tables and are required to work on some of these tables to create queries, reports and forms as indicated in the assignment. As part of the assignment, students are required to replace the first and last name of a specific employee in the EMPLOYEES table with their own first name and last name. The data macro created by the instructor, as detailed below, records these changes in hidden columns in one of the unused tables. If the assignment changes hands with student's replacing the earlier students' name with their own name, the unused table will reveal the name of each student involved in plagiarism. The process involves simple steps that are to be taken before giving the assignment file to the students and after receiving the completed assignment file from the students. Before giving the assignment file to the students, complete the following steps: 1. go to design view of the EMPLOYEES table (Figure 1) 2. click on the "Create Data Macros" (Figure 1) 3. click on "After Update" (Figure 1) and fill in the code as per Figure 2. This will append rows to the PRODUCTS table with any changes to the EMPLOYEES table. 4. The FName and LName columns of PRODUCTS table should be hidden by going to the datasheet view of the PRODUCTS table, right clicking the column headers, and clicking on "Hide Fields" (Figure 3). This is done so that students do not see their names in case they open the PRODUCTS table. The PRODUCTS table is not related to the work required by the student on the assignment and will most likely not be opened by the student. After hiding the columns, PRODUCTS table will look like Figure 4. The database is now ready to be sent to students.
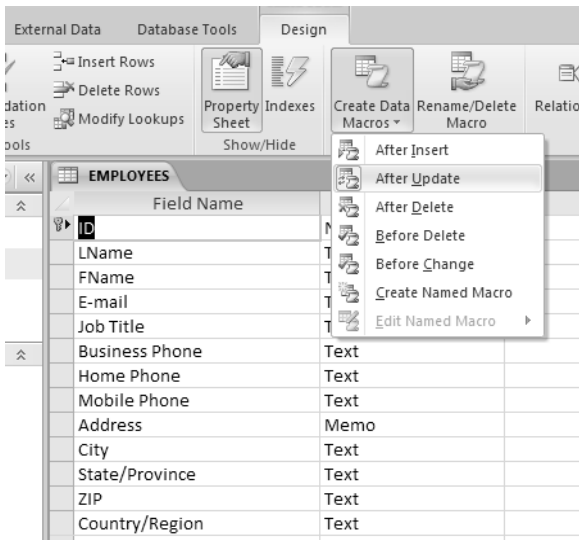

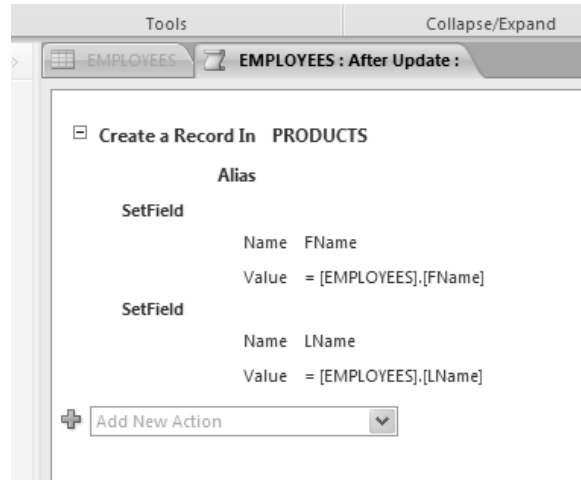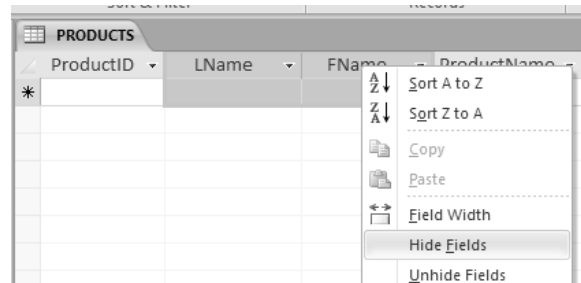**Figure 1: Creating Macro to save changes in EMPLOYEES table**

Figure 2: Data Macro Code

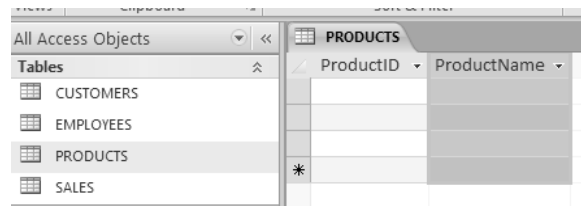**Figure 3: Hide columns in PRODUCTS table**

Figure 4: PRODUCTS table with hidden columns

In the assignment details, students are asked to replace one of the names in the EMPLOYEES table, Mathew Reeves, with their own last name and first name (Figure 5). Each time a student changes LName or FName in the EMPLOYEES table, a new row in the PRODUCTS table will be created automatically. This will happen without the student's knowledge. Therefore, if the assignment changes hands with student's replacing the earlier students' name with their own name, the names of each student involved in plagiarism will exist in the PRODUCTS table.

Figure 5: EMPLOYEES table

As an example, let us assume a student, Jack Colwell, copies the assignment from another student, John Cruthirds. Jack replaces John's name with his name in the EMPLOYEES table. Furthermore, let us assume John Cruthirds himself had earlier copied the work of Julian Liao. After receiving the completed assignment file from the students, complete the following steps: 1. to unhide the two hidden columns, go to datasheet view, right click on any column header and click unhide (Figure 6). 2. Check LName and FName (Figure 7), and click the *close* button . This action will reveal the two hidden columns and their content, identifying those who have plagiarized (Figure 8).
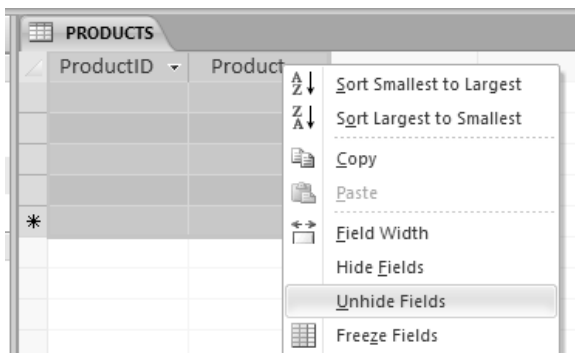

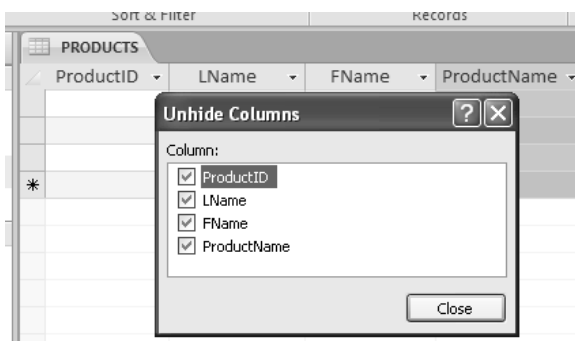**Figure 6: Unhide columns in PRODUCTS table**

Figure 7: Check hidden columns LName and FName

Figure 8: PRODUCTS table after unhiding LName and FName columns

4. EXPERIENCE

The author used this method in six sections of a database course spanning two years and was successful in identifying five cases of plagiarism. When plagiarism was detected, the students involved, admitted plagiarism without having to be shown the hidden content. They were given a zero in the assignment (worth 10 % of final grade) and were made to sign a statement about their plagiarism that was sent to the dean of students.

Although using this method does not guarantee detection of plagiarism in all cases, it is useful in detecting the more common practice of plagiarism where a student takes a completed or partially completed copy of the database, modifies it and submits it as his/her own.

5. INTEGRITY OF DETECTION METHOD

The author's policy is to show the hidden content only when his decision regarding the grades was challenged. The students accepted the author's decision once they were told who they had copied from. This has ensured that students do not find out about the plagiarism detection method. To further improve integrity of the tool, add more tables that are not relevant to the assignment. Students would not know exactly which table has the hidden content.

Additional techniques can be used to complement this method. To make it difficult for a student to cheat, each completed assignment can be made unique by asking students to use personal criteria in assignment data content (Kumar, 1998). For example, students can be asked to use some function of their student-id or date of birth for values such as interest rates and use names of friends to replace vendor names in the vendor table. Identical inputs among submitted assignments reveal possible cases of plagiarism. Furthermore, macros can be used to track the above mentioned inputs too.

6. CONCLUSION

Assignments requiring submission in digital format provide students with additional opportunities for plagiarism. This paper showcases a simple method to detect and document plagiarism in MS Access assignments. A simple data macro is used to save all changes made to a table. The hidden history of changes in the submitted database acts as evidence of plagiarism. This method has been tested and proved to be effective and easy to implement. MIS instructors can use this method to detect plagiarism in both assignments as well

as quizzes where hands-on work in MS Access 2010 is involved.

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