Transformations to Issues in Teaching, Learning, and Assessing Methods in Databases Courses

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Abstract—there is a high demand from academic centers, business firms and marketplaces for highly qualified expertise in database areas. As a result, it is undoubtedly fundamental for academic researchers in the field of databases and education to conduct more research works so that to enhance teaching, learning, and assessing methods of database courses. This paper describes the salient features of these databases courses and highlights the issues of traditional teaching/learning/assessing methods of database courses at universities in Kurdistan in general. This paper also provides comprehensive reformations to those issues.

Keywords: Databases, Learning and Assessment Methods, Database Teaching Issues and Transformations.

I. INTRODUCTION

Database technologies have shaped to great extent almost all theoretical systems and generated a good number of practical systems after years of development. It is actually estimated that approximately 80% of the entire computer applications are connected to database technology applications [1, 2]. In addition to this, the development of technologies in the field of network communications and knowledge mining has created more prospects and further views for database technologies [2].

According to Hui, databases and their technologies are the basis of information resources manipulation, utilisation and administration of information in the information society. Hence, teaching databases & management information systems courses and taking responsibilities to nourish the theoretical and practical aspects of these courses to learners at the universities and institutions are paramount of importance in higher education. It is worth mentioning that instructors in databases and related courses must be concerned with how to teach their learners so that to fulfill the needs and supplies of their community demand [3].

II. DATABASE TEACHING AND LEARNING ISSUES

It is also clear that not having a distinct accepted design methodology for all universities for relational databases creates many problems for instructors in educational systems. The design of databases leans to be contingent rather on more experience, trial and error, educated presumptions and perceptions than steps that are taken prudently to design [6]. In fact with having these problems in the subject, the instructors will have more difficulty to explain to their learners which require getting management perspectives instead of having profound treatment of some practicality that are common in Computer Science that can be found in text books [4, 5, 7]. There is also a traditional problem at universities in which a transition from very old type of databases such as the hierarchical structure which were very common in 60s, then through the networks structure in 70s, to relational model in 80s and continued to 90s [7].

The paper in the following sections aims at identifying major problems and issues in traditional teaching databases courses such as contents, methods, teaching materials, practical problems, etc. and producing suggested teaching transformations to these problems and issues.
A. The absence of teaching Determination

One of the crucial problems that can face databases learners is that the teaching tenacity is not clearly defined; this problem is caused by the following reasons:

1) The instructor did not define a consistent teaching session routine.
2) The instructor did not constantly define the learning objectives, refine and link them as the learners are progressing in their class.
3) Instructor’s lack of having a clear road map or an organization structure for his or her class, this will lead to time consuming and effort fading.
4) The absence of a clear teaching purpose can have some outcomes in which the program and syllabus shorten methodical order, and might make the steps to develop courses in the professional curriculum are not straight forward.

B. The contradiction of Content and Theory

1) Usually the absence of the contents and their matching practice in databases courses create problems and confusion for learners.
2) Lack of prior knowledge about the present content will not help learners to establish common base of understanding in the content.

C. Traditional teaching methods

The instructor does not have a policy to help learners to overcome the problem of not combing both theory and practice during their learning period. This can be explained in the following steps:-

1) Most of the databases courses are tailored in a way that materials are essentially structured in accordance with teaching contents and the order of acquaintance method. This means that initially the program centers on foundation theory of database and then puts more emphasis on specific database system software.
2) The first phase includes the introduction of basic theoretical information, and then the second phase deals with elaborating on specific use of a database system giving to the order of organized manuals and course books. And finally, in the third phase the corresponding illustrations will be given according to the theoretical knowledge and command.
3) It is also noticeable that instructors have to concentrate on the procedure of approaches of data, information, knowledge and skills to their learners in this kind of classroom teaching, in which data, information, knowledge and skills are very central in use.
4) Accordingly, despite the fact that learners initially gain the aspect theories, but meanwhile they fail to comprehend on how and when to apply them, this is because learners believe that these theories are so broad-based and very problematic for comprehension, which tips to create some sort of disinterest and discomfort in the learners’ learning process.
5) As a result, in this way few isolated knowledge can be acquired by the learners and a simple operation of software is mastered at the end of the course.
6) The followed current situation of teaching methods is an instructor oriented thought of university in which an instructor is considered as the center and gives precedence to the course and theory instead of using practice [3].

D. Assessment of Practical Skills Is Missing

The learning motivation of learners rests on various assessment techniques. In Kurdistan universities in general, the learning motivations of learners in courses are assessed via an amalgamation of both theory tests and actual working on computer experiments. One of the problems of the assessments is that the examinations of theories are completely concentrated on theoretical knowledge in which the connections of these theories with their practical tests are missing.

Normally, learners are unable to work with database analysis, development and design on their own in the hope to solve some particular problems. Thus, learners are soon getting discouraged and dispirited as they only have to digest too generic ideas in abstract shapes during the course.

Sooner or later, learners will have to work hard to memorise in order to learn and will forget all of these gained information right after the examination is over. This is because learners have learned to solve some short questions to practice as examination tests and produce an observed report. Keeping in mind that one could not deny that learners will gain some skills on how operate practically.

III. DATABASE TEACHING AND LEARNING TRANSFORMATIONS

It is obvious that database courses can be enhanced practically via the following steps and these are namely: identify clearly practical objectives and requirements for all various courses, construct and develop the contents of teaching according to learners learning abilities and enhance the teaching methods via adopting a way that focuses on the interaction and attention of all learning and teaching communities in the hope to change the attitude of the learners from passive information and theory database takers to seekers and searchers for knowledge actively and also to target exploring abilities of being innovative learners.

The following transformations should be done so that to improve teaching databases closures in Kurdistan Universities:-

A. Upgrade the Teaching Content

The industrialisation in databases has been progressed due to database technology which is in fact is well-thought-out as one of the wildest rising fields in Computer Sciences, Software Engineering, information technologies and etc. Plus, it is obvious that there is a growing demand for using learners of databases from business firms and academic research centers due to their bulk utilisation of a wide range of applications of Information Technology, thus there must be an effective action
to enhance, update and improve the database courses in colleges and universities across Kurdistan region. Subsequently, within the database courses, the academic communities should work hand in hand to produce a teaching content that is updated which reflects the development of disciplines so that to fulfill the practical application demand for the above business and academic firms.

Therefore, it is necessary for the universities and colleges to determine the corresponding teaching goal and objectives, in addition, the teaching of databases in these universities and colleges should be based on several levels and different orientations and learner employment. Further, these universities and colleges should have different requirements for different levels and different instructors in database courses in order to select the corresponding teaching contents at those mentioned levels. It is useful for the academic communities to comprehend the changes and development of databases [8].

B. Update Teaching Methods

The ordinary teaching of knowledge system is concerned with theory course which is based on the logical sequence of teaching material to present knowledge ideas. However, the teaching mode can be modified in a way in which the teaching mode can select a case as the arrow of the teaching. It is more helpful for the learners if the teaching mode present the important knowledge ideas around the case. This can be achieved via presenting the application background of the case and then directly create the functional analysis so that to help learners to explore more about problems and then after produce little or needed theoretical knowledge to tackle the problem. After learners managed to work out the analysis and also succeed to solve the problem using the needed theoretical knowledge.

The role of instructors is to produce more needed knowledge around the case in their teaching material in both the design and planning parts, so that learners will be able to put it into practice [4, 8]. The above enhancement can be accomplished by amalgamating both theoretical and practical teaching via presenting multimedia, which can be used in a way to teach databases teaching and practical aspects. Using projects technique which is introduced by authors in University College of the Cariboo (UCC) to help learners enhance their confidence and comprehension abilities in dealing with database subjects, their courses of databases include some projects [5].

Databases courses are not only purely theoretical, they are rather practical courses. The impact of computer operation affects directly the teaching effect and helps learners comprehend and digest the theoretical aspects that were taught in class rooms [8, 2]. Thus, it is considered as the most aspect for learners to learn database and get succeed in database courses. For this reason, it is essential for us to emphasize on reinforcing the practice in teaching so that to promote team consciousness and creative ability for learners of databases.

This can be achieved by creating a rational plan for the computer experiment classes, coordinating and connecting the computer experiments to the theoretical teaching. Thus, this process needs instructors to develop computer experiment contents in accordance with course content progress prior to class.

It is fairly compulsory for the instructors to make sure to take the impact of the experiment and all the written steps of computer experiment unmistakably into consideration. In this manner learners should operate computers based on the written instructions of computer experiment.

Then the instructors need to do some elaborations on some problems existed in the experiment. This process can be done via dedication of time by instructors so that to guide their learners through all the difficulties that learners faced in the process of computer practice. This period of time to guide learners must completely be allocated for solving and working out the problems as instructors are unable to create such a chance/time in normal teaching classes.

It is then required from learners to record the purpose, content, experimental phases, practical experiences and problems that they have faced before, during and after that assigned task in an all-inclusive report. The role of instructors is to allocate time to go through each report and give favorable and unfavorable comments and suggestions. In this way, learners will learn to be able to work independently or in a team. Eventually, learners are needed to work out with a relatively small database application system in relational database management system, say for example for a department or a company. They can use suitable tools and techniques of application systems development, and demonstrate phases of design, key functions, operational steps and instructions of the system plus record their own conclusions based on their experiences about different problems that are being solved or unsolved, finally furnish their future suggestions, comments and recommendation thoughts [2].

In doing so, and in the process of system design and development, learners will be able to get stimulated to leading the course contents, models, skills, tools, and promote the practice ability, innovation spirit, the system thinking and the sense of team work.

C. Update Assessment Method

In order to find the effect of how important the teaching for the learners was, we need carry out an assessment via tests. This has been a vital standard for learners and instructors. Conventionally, instructors test the learners in a written way. Then after teaching in the implementation of the project, instructor could find that the written examination cannot effectively reflect the teaching of the ambiguities and dodges, as the tests at the end of the course produce the scores which are deemed to be the salient features to upraise the learners. Thus, this type of assessment will help learners in most of the cases give clearance to pass the exam. Yet, the university will fail to concentrate on learners’ progress in terms of capacity and compression of learning the database courses. This way is surely not helpful for the learners.

Thus, it is crucial for the instructors to ask their learners to turn in their research and development work as the content of the exam and let learners resolve their problems. In doing so, the practical skill of learners will be highly effective, refined
and nurtured. Consequently, the scores of practical will help learners learn and gain knowledge over the key concepts. Apparently solving problems and thinking skills for learners can be achieved and created via examining the integrated use of knowledge by the learners [2, 4, 5, 8].

IV. STUDY INVESTIGATION

This investigation is a mixed mode technique that involves two phases: The first phase comprises interviewing a focus group of IT/Computer Sciences/Software Engineering instructors at some chosen universities in Kurdistan. The main purpose of this phase is to accumulate in depth intuitions, reactions and thoughts in the hope to help develop and build insightful questionnaires. The focus group interview is semi-structured to ensure that all interviewees are asked the same set of open ended questions. The duration of the interview is 2 hours. The number of focus group members is 7. In the focus group interview phase the authors learnt the current situation of teaching databases in Kurdistan. Upon closing the focus group task, the major issues and transformations are discussed so that to construct questionnaires. The design of structured questionnaires is the second phase. The structured questionnaire covered 51 questions. These questions addressed the issues and transformations in teaching, learning and assessing database courses in universities in Kurdistan. Questionnaire included the following five rating scale: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree and 5-strongly agree. Questionnaires were disseminated among roughly 170 learners at different levels and 7 instructors of databases courses. The authors received only 140 complete responses from participant learners.

V. DISCUSSION

Upon examining the issues of the survey results, it is evident that most of the learners detected two great issues that can affect the teaching, learning, assessing database courses, and these are; the traditional teaching methods and assessment of practical skills is missing, see Figure 1.

The above realisation also was relatively perceived by instructors; the results also show that absence of teaching determination by the instructors would clearly create problems to demotivate learners as shown in Figure 2.

Fig. 1, displays learners’ opinions on the issues.

Fig. 2, displays instructors’ opinions on the issues.

In Figures 3 and 4, roughly both learners and instructors evidently proved that there is a need for upgrading the teaching content and updating teaching methods.

Fig. 3, displays learners’ view on the transformations.

Since databases technologies are considered as rapidly increasing discipline and as there are different types of databases; thus, it is compulsory that the courses contents in databases should be unceasingly attuned so that to retain the rapidity of database technology development.
Fig. 4, displays instructors’ view on the transformations.

Thus, based on the above elaboration, the learners and instructors’ reflections on the survey and group focus discussion interview, the authors have suggested a new configuration or formation for the major database courses in universities in Kurdistan. Note that blue colour boxes represent the levels (academic years) of learners; green colour boxes represent different courses, yellow color boxes represent tools and pink colour boxes represent concepts, (see Figure 5).

Fig. 5, displays the suggested configuration or formation of database courses at universities in Kurdistan.

It is also clear that the course of database is very practical. Instructor should encourage learners to give in reports after the practical, and instructors also should check on learners to compose the practical purpose, practical contents, practical steps and the knowledge, outlooks and glitches run into in the process of experiments in the experiment reports [10].

Databases and its applications are courses in which both theory and practice must be combined. Learners will only be able to memorise the important theoretical knowledge if there is only a theory test for them as an evaluation method [11].

Clearly, the absence of these transformations will deter learners’ abilities to comprehend, learn and think seriously to apply the theory into practice [11].

It is important for the instructors to add practical quiz tests and practical activity tests into practical sessions in addition to theoretical quizzes and theoretical activity tests.

VI. CONCLUSION

It is clear that most applications in Computer Sciences are connected to database technology applications. Thus, it is so dynamic to work with both theory and practice simultaneously and in order to do so; authors in this paper have supported comprehensive transformations in teaching contents, teaching methods, assessment mode and other related aspects. This paper combines both ways of teaching namely; theory and practice. And also raises the teaching to practical application. Different teaching resources are combined so that to offer a comfortable learning environment for learners.

REFERENCES


