
Catering for DBMS training needs of the Bay of Plenty region

Don Kannangara

Department of Computing
Technology and
Communications.
Waiariki Institute of Technology
Rotorua, New Zealand
Don.Kannanga@waiariki.ac.nz

Momir Radicevic

Department of Computing
Technology and
Communications.
Waiariki Institute of Technology
Rotorua, New Zealand
Momir.Radicevic@waiariki.ac.nz

This quality assured paper appeared at the 2nd annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2011) incorporating the 24th Annual Conference of the National Advisory Committee on Computing Qualifications, Rotorua, New Zealand, July 6-8. Samuel Mann and Michael Verhaart (Eds).

Abstract

Vocational education should by definition balance educational and work requirements. To achieve this, the Department of Computing, Communications, and Technology (CTC) at Waiariki Institute of Technology, Rotorua, has been using the Oracle Database Management System (Oracle 10g) as a teaching tool to teach database related courses in the Bachelor of Computing Systems qualification since 2002. This research was aimed at finding out if Oracle was the most suitable Database Management System (DBMS) to be used, taking into consideration its appropriateness as a teaching tool, as well as the interests and needs of stakeholders including trainers, users and developers of DBMSs in the Bay of Plenty (BOP) region. A web-based survey revealed that Oracle met a primary requirement as a database using ANSI (American National Standards Institute) compliant structured query language (SQL). However, Microsoft SQL Server was found to be a better choice in preparing students for employment within the region.

Keywords

DBMS – Database Management System, DBMS Training.

Introduction

In choosing tools for teaching, tutors need to balance wider educational needs against the specific immediate

work needs of local employers. In the case of databases, this involves considering both the instructive utility of tools and the actual use of tools in the workplace. In order to address this issue, it is necessary to determine which DBMSs are useful to employers, and this paper presents the findings of such an investigation.

The School of Computing Technology and Communications at Waiariki Institute of Technology (WIT) has used the Oracle Database Management System (Oracle 10g) to teach database design, implementation and administration courses in the Bachelor of Computing Systems (BCS) qualification for the last 9 years. There were two main reasons for choosing the Oracle DBMS. Firstly, this qualification has been run under the UNITEC umbrella and Oracle matched the UNITEC prescriptions for such courses. The second reason was that a New Zealand wide survey on the use of DBMSs in polytechnics and industry revealed that Oracle DBMS was the most popular DBMS among tertiary providers in New Zealand (Kannangara, Momir, & Fraser, 2002). In addition, unlike most other DBMSs, Oracle10g has the advantage of running on both Microsoft Windows and UNIX platforms readily (Sommarskog,2008). This was an advantage to our students to gain valuable knowledge and hands on experience with Oracle10g in Microsoft Windows-XP client, and Red Hat Linux server environments. According to the Gartner 2009 Worldwide RDBMS Market Share Report (Graham et al., 2011; as cited in Gelhausen, 2011), Oracle leads the DBMS market with 48.0 per cent market share worldwide. Oracle also introduced ANSI-compliant SQL joins in Oracle 9i (Billington, 2007). Thus, our students arguably enjoyed the ANSI standard SQL experience and also the status

of having market leading DBMS knowledge leading theoretically to advantages in the job market in NZ and abroad.

From 2011, however, WIT will be offering its own Bachelor of Computing, Communications and Technology degree (BCCT) and can choose the most suitable Database Management System (DBMS) to be taught, while taking into consideration the needs and interests of database developers, trainers, and users in the BOP region. A preliminary search of available databases, including Computers & Applied Sciences Complete, Australia/New Zealand Reference Centre, Directory of Open Access Journals and Index New Zealand, indicated there was no relevant literature on the region. Therefore, we decided to find out what Database Management Systems are currently being used in the BOP region and what DBMS skills are likely to be needed from potential applicants for database related work at relevant organisations. This practical research is in line with WIT's mission statement that emphasises the goal of delivering "skill sets and intellectual capital needed in our region" (Waiariki Institute of Technology, 2008, p.2).

Methodology

Descriptive research involving a structured cross-sectional online survey was conducted through a web based questionnaire. The questionnaire was available for a period of one month and the deadline to complete was 14th of February 2011. It was agreed as a condition of participation that individual data would not be released but that global findings would.



The questions asked were:

- a) How long has your organisation been in business?
- b) What DBMS are you currently using?
- c) Does the currently used DBMS meet your needs?
- d) Do you plan to consider an alternative DBMS in the near future?
- e) Do you think that Oracle DBMS experience is in demand in the BOP job market?
- f) What DBMS do you suggest CTC use for teaching database related courses?
- g) Which DBMS knowledge do you expect from potential applicants for DBMS related work at your organisation?
- h) What is the number of employees in database related work at your organisation?

The relevant variables were as follows: reasonable stature of the respondent within the industry (Questions a & h); likelihood of dramatic change within the region (Questions a, d & h); maximum utility of the taught database (Questions b, e, g, h); and future proofing of the taught courses (Questions c, d, f, g). The survey questions provided basically adequate categorical and independent variables. The only extraneous subject variable was the potential vested interest of the rival training providers, but this was minimised by their low representation in the sample group. Correlations between the answers for Questions d, f & g, Questions c & d and Questions b & h were expected to provide a degree of internal validity.

Comments were invited of the respondents to support their answers.

Due to the limited number of industries using DBMSs in the BOP region, we did not apply any criteria to select participants for the survey, so one limitation of the study is the relatively small sample pool. However the relevance to employment in the area is direct and the survey was focused on that need. The Atlantis 800 Business Directory was used to prepare a list of database related businesses in BOP region. In addition, CTC Local Advisory Committee (LAC) members, all the district councils and the major training providers were included in the list. We sent the web address of the questionnaire to 25 organisations by email. We had to post hard copies to few organisations as we could not find the email addresses. From those, 14 completed the online questionnaire, representing a reasonable sample proportion. 21% of the respondents were from the DBMS trainer category and the rest (79%) were from the DBMS industry (Figure 1).

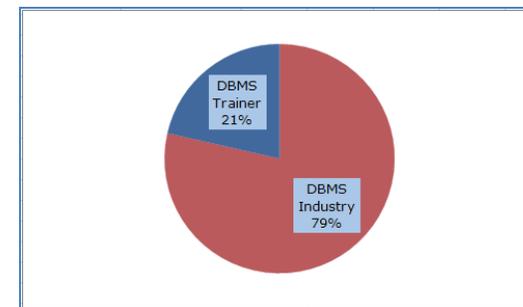


Figure 1. Participants of the survey

Findings

From the answers to demographical questions we asked, we found out that thirteen out of fourteen organisations were well-established as they had been in

DBMS related services for more than ten years. We also found that most of the organisations involved in this survey were small, six out of the fourteen (43%) having fewer than six employees engaged in DBMS related work, and 71% having fewer than ten (Figure 2). These figures give an indication of the admittedly limited job market for DBMS workers in the BOP region.

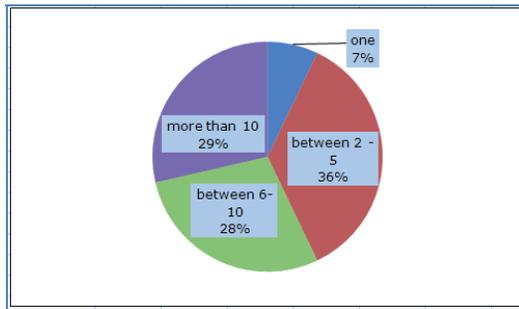


Figure 2. Number of DBMS employees

The Microsoft SQL Server was found to be the most popular DBMS with 93% usage among the participants in the survey. Access was second with 57% (Figure 3). The Oracle DBMS was being used by only two respondents in our data sample. MSSQL, MYSQL and PostgreSQL were the other three DBMSs which are being used in this region. Thirteen out of the fourteen participants who participated in the survey said that the currently used DBMS(s) meets the needs of their organisations and they do not wish to consider alternative DBMSs in the next two years.

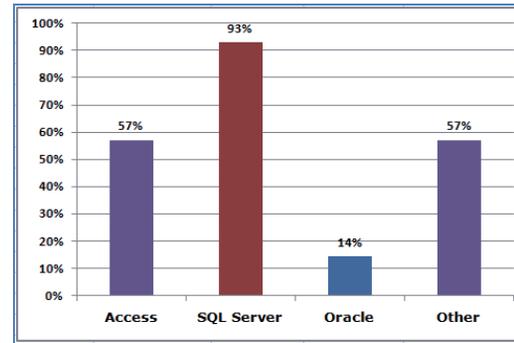


Figure 3. Current DBMS usage in BOP region

93% of the respondents considered Microsoft SQL Server as a very suitable or suitable DBMS to be used to teach database related courses at CTC. The second highest percentage was 64% for Access DBMS, followed by the Oracle DBMS with 57% (Figure 4).

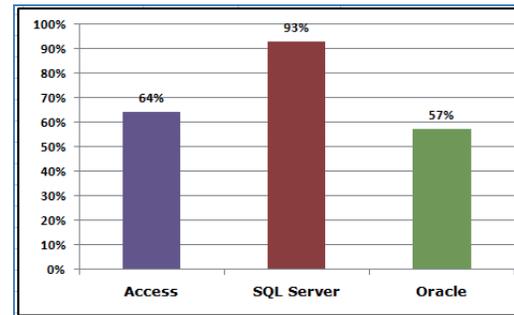


Figure 4. DBMSs suggested (suitable or very suitable) for teaching

It was also found that 86% expect Microsoft SQL Server DBMS knowledge from their potential applicants for DBMS related work at their organisation (Figure 5). Only two out of the fourteen said that they expect Oracle DBMS knowledge from job seekers. The second highest in demand with 43% was for applicants with Access DBMS knowledge (Figure 5). To the question whether Oracle DBMS experience was in demand in the Bay of Plenty job market, 43% said "NO" while the others (57%) said "NOT SURE"

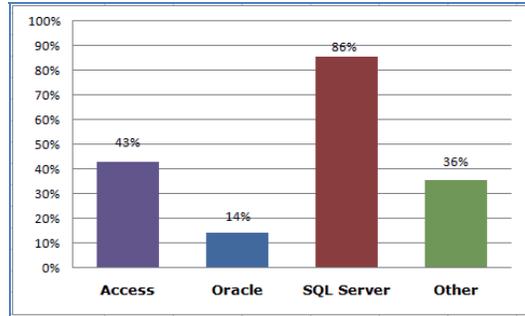


Figure 5. DBMS knowledge expected in BOP region

Comments from the participants in favour of Microsoft SQL Server included: it is feature rich, fast moving and familiar, and it has MS pedigree and a transparent development path. One participant commented on the availability of advanced DBMS features such as better security in the Microsoft SQL Server. Another stated that the choice of this server reflected the fact that "our business and all businesses mid range are using SQL server." Another comment in support of MYSQL was that "MYSQL is more prevalent and students should be exposed to it". Another indicated that both Microsoft SQL Server & Oracle offer enterprise capability. On the

other hand, two respondents noted that Oracle SQL is more ANSI compliant than other DBMSs such as Microsoft SQL Server.

More than half the participants made positive comments about Access DBMS due to it being simple, easy to learn, easy to use, fast and useful as a development tool. There were a few concerns that it doesn't support multi-access and rollback. Nonetheless, Access shares with Microsoft SQL Server ready availability and ease of deployment in a wide range of businesses. A comment on open source DBMSs such as PostgreSQL & MYSQL, was that they had adequate features for small businesses such as those in the region. According to this participant, Oracle tends to be of more use to larger corporations. A corroborating comment was that the Microsoft SQL Server is generally useful, but Oracle may be suitable for corporate or large organisations using UNIX with highly qualified staff.

Another general comment was that all DBMSs are suitable as they are just tools. It is the understanding of the most effective use of these tools for the objective you are trying to achieve which is the critical thing. A comment from one DBMS trainer in the BOP region was that students should have multiple exposures, using Access at introductory level as well as Oracle & Microsoft SQL Server to teach database concepts and implementation. A free DBMS such as MYSQL could be used in programming for quick connection practical work.

Discussion

According to the findings, most organisations use more than one DBMSs. Currently the most widely used

(93%) DBMS is the Microsoft SQL Server. More than half of the organisations also use Access. There is a significant number of organisations using open source and free DBMSs such as MYSQL and PostgreSQL, but there are very few (14%) using Oracle (Figure 3). None of these organisations wish to consider alternative DBMSs in the next two years.

Several organisations suggested using more than one DBMS for teaching at CTC. Almost all (93%) suggested Microsoft SQL Server to be used for teaching and more than half wanted Access to be used (Figure 4). Most organisations (86%) expect Microsoft SQL Server knowledge from potential applicants for DBMS related jobs. Few organisations (14%) expect Oracle knowledge from applicants for DBMS related jobs (Figure 5). Although Oracle has not been used in many organisations, the majority of them recommended Oracle for teaching database related courses (Figure 4).

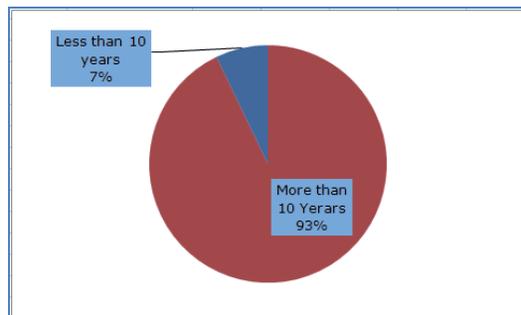


Figure 6. Established Periods of organisations

According to our findings, most organisations (93%) involved in the survey were established a decade or more ago (Figure 6) and 71% of the organisations have

fewer than 11 employees for DBMS related work (Figure 2). In fact, there is only one organisation established in the last decade, and the industry has an average of about 7 employees engaged in such work. These figures indicate that there is no emerging DBMS job market in the BOP region. Clearly, most organisations that use DBMSs are not large enough to employ graduates and there are no larger corporate networks involved.

As a result, many participants seem to be quite comfortable with the simplicity, rich features, and availability and ease of deployment of DBMSs such as Access, Microsoft SQL Server, MYSQL and MSSQL.

Conclusion

The findings of this survey clearly show that change is needed, and that in using Oracle DBMS for teaching purposes WIT does not directly cater for the DBMS needs of the BOP region, either currently or for the foreseeable future. The Microsoft SQL Server was found to be the most appropriate choice for CTC in servicing the needs of the relatively small number of small players in the region. We found there was little expectation of growth in the DBMS industry, the job market, or corporate level databases in this region, suggesting that there is limited need for another DBMS. Therefore the means for preparing graduates to satisfy just the DBMS needs of the BOP region need to be reconsidered. Despite the low number of users of Oracle in the region, the large number (57%) suggesting Oracle be used at CTC indicates that the industry is aware of the importance of employing a DBMS with ANSI- compliant SQL for teaching purposes. This may provide a rationale for offering Oracle in at least one course.

Acknowledgements

We would like to thank the Waiariki Research Committee, especially Professor Cris Brack, for valuable suggestions on ethical issues and in preparing the questionnaire. We also acknowledge and thank Mr. Graeme Holdaway, for his valuable contribution in proof reading and formatting this research paper.

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