

**Should database education be more focused on preparing learners
for careers involving event management?**

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ABSTRACT

Although technological innovations have brought about major changes in the hospitality industry, such innovations have tended to come from outside the sector. Research has indicated communication difficulties between industry practitioners and technical experts. This has important implications for event management. The attention to detail required for the success of all but the smallest events demands the use of suitably designed relational databases. This pilot study examines learners' attitudes, upon completing a focused event management database module, toward computer use in general and databases in particular. Learners from three consecutive years of an Event Management degree course were surveyed. Information was also collected regarding the methods of record-keeping encountered by learners when working in the industry.

The results of this study indicate that, upon completion of the module learners are significantly more confident about creating an event database themselves than discussing their database requirements with a professional database designer.

Event managers who have the confidence and ability to create customised relational databases for events will have a competitive advantage in their careers. They will be able to leverage database technology to deliver increased customer satisfaction at reduced cost.

The reluctance to discuss requirements with Information Technology experts needs to be explored in detail in order to ensure that the innovation initiative is not ceded to sectors outside the tourism and hospitality industry.

INTRODUCTION

This pilot study focuses on the evaluation and improvement of the database segment of a 'Database Management and Web Design' module undertaken in the first half of the second year of a level 7 degree in Event Management at an Irish Institute of Technology. Over a three year period the module content and delivery methods were reshaped to increase both relevance to the industry and flexibility of learning styles. Learning style describes the means by which individuals perceive and process information—that is, the “distinct ways they go about learning” (Biggs, 1987).

The tourism and hospitality industry, which is characterised by a high volume of low value transactions, has seen major innovations based upon database technology. Of the seventeen innovations by “IT Best Practice Champions” in the lodging industry listed by Siguaw and Enz (1999), fourteen were, in fact, databases.

For any event involving sizeable numbers of named individuals taking part in activities, database technology can deliver improved customer service and customisation, while simultaneously increasing control over the event and reducing costs. The need for relevant database education is not in doubt.

Hornby et al. (2009) evaluated the relevance of an 'Information Systems for Service Industries' module to degrees in tourism, leisure, event, hotel and sport management at Griffith University in Brisbane with the following result:

First, the tutorial content was changed, discarding the office automation software and replacing it with database and website development. These two technologies were chosen as they underpin many of the applications examined in the industries of focus, thus making content real world and relevant.

However, due to the difficulties they encountered in delivering the database portion of the module:

The first major change was to eliminate the database content and associated assessment. Student feedback and grades both indicated that the database content had been too challenging, and no more time could be made available to further focus on such content (ibid.).

It is desirable for the academic community in events to reshape event management curricula constantly to help students prepare for employment in the event industry (Lee et al., 2009).

Harrington (2009) describes beginning the delivery of his college course in database management with the words “There is no term more misunderstood and misused in all of business computing than *database*”. He bemoans the confusing of any list management software such as spreadsheets with actual *relational* database management system software (RDBMS).

The ability to represent relationships between data is the huge advantage of RDBMS. This is especially significant for events which have at their heart a relationship of the type:

- Delegate *delivers* paper.
- Contestant *performs* act.
- Exhibitor *rents* booth etc.

Use of appropriate software which supports the representation of relationships simplifies data handling and avoids errors arising from storing duplicate data which can become inconsistent. Data such as delegate addresses need only to be entered or updated once. In contrast, when using simple list processing, spreadsheets or word processing software an address must be entered repeatedly wherever it is used: address labels, name badges etc.

If imparting such concepts is difficult for Harrington in the delivery of database modules on computing courses then it is easy to understand why Hornby et al. (op. cit.) found it necessary to remove the very module they had identified as a core subject for tourism and hospitality education. Using software with RDBMS capability does not necessarily guarantee a *relational* database; this is created at the design stage.

However, the potential benefits of producing database literate graduates in tourism and hospitality are clear:

- Return the information technology innovation initiative to the sector:
 - Innovations often involve the combination of new and existing systems and RDBMS are intrinsically more suited to integration. The new consumer wants

to be addressed in personalized ways and with customized messages that reflect individual preferences (Windham and Orton, 2000).

- Ramdeen et al. (2009) outline the benefits to the hospitality industry of integrating ICT systems: reduced re-keying, reduced lead times, improved productivity, improved quality of information and reduced costs.
- “Overall, the potential to use new technology to reduce the distribution cost of information should allow the development of many new ‘niche’ tourism products” (Deegan, 2007).
- Promote collaboration between academics and industry to increase professionalism in tourism and convention and event management; Moscardo and Norris (2005) highlight studies showing the graduate as a critical resource in bridging gaps between academics and practitioners. “Successful graduates with good skills can generate respect amongst practitioners for the efforts of academics and also take and diffuse new knowledge into the workplace improving practice”. They also point to discussions of convention and event management recognising the need to increase the professionalism and standards of planners and managers in this field.
- Encourage destination management organisations (DMOs) to harness technology to gain competitive advantage:

Managers are expected to have professional knowledge and capability to work on a computer, to develop products, to innovate, to manage the destination, projects, results, possess the managerial knowledge of getting the best of the impact of globalization, management of changes, knowledge and skills in marketing and selling (Vujic et al., 2008).

Gretzel et al. (2006) cite studies which argue that both:

- The greatest agent for change in destination marketing is technology, which increases the ‘intertextuality of contemporary destination marketing’ by adding new media and means to represent the destination.
- DMOs have not fully incorporated technology in their operations and strategies.
- Industry demands transferable skills: In 1997 Amoah and Baum pointed out that the education system focused on broad-based and general knowledge whereas the tourism and hospitality industry needed transferable skills. Malone (2006) describes transferable skills as ‘soft’, ‘core’ or ‘key’ skills developed in one situation but which can be transferred to another. She includes in this category conceptual / thinking skills:

such as collecting and organising information, problem-solving, planning and organising, learning-to-learn skills, thinking innovatively and creativity, systems thinking.

These important skills are fostered by database creation exercises.

- The event industry, more than any other, requires the repeated creation of customised databases. For most other industries a customer database or enterprise resource planning database is installed once and used until it needs to be upgraded or replaced. In the event industry, however, the database requirements can vary considerably with each event type.

What Level of Database Literacy does the Event Industry Require?

Database education can be designed to produce professionals with a variety of abilities from database user through database requirements analyst and database manager to database designer/creator.

From the point of view of database support, the event industry is currently dominated by business events or so-called 'MICE' (Meetings, Incentives, Conventions and Exhibitions). This situation is analogous to the early days of electronic hotel distribution. The Global Distribution System (GDS) is a limited database system designed for the distribution of standardised products such as airline seats; this system conferred a competitive advantage on large hotel chains which also offered a standardised product. Smaller independent hotels market themselves on their differences rather than their similarities and were disadvantaged by their unsuitability to GDS distribution.

With the proliferation of online event registration options and the possibility of outsourcing this function, it could be argued that graduates with the ability to use any database will be sufficiently prepared in this regard for their career. MICE events are more easily supported by generic event management software whereas it is difficult, if not impossible, to adapt this software to support special events. The field of special events has now grown "so vast that it is impossible to provide a definition that includes all varieties and shades of events" (Allen et al., 2005).

Database support for special events is not as amenable to outsourcing as for MICE events, yet this is a promising area with regard to the entrepreneurial opportunities offered by integration, customisation and innovation.

For this reason, and because of the attractiveness of the cost-savings to be gained from in-house database support, especially in an economic downturn, it was considered important to include some element of database design into the module.

Another strong reason to include database design in the module is that the relationship at the heart of all events, described earlier, lends itself to a repeatable pattern which can be customised to a huge variety of event types. Such specialisation and repetition would offset, to some extent, the disadvantage (in relation to this task) of not being Information Technology professionals.

Original Database Management and Web Design Module

A programmatic review conducted in 2007, of the Bachelor of Business in Event Management degree course, was the catalyst for this study. While a 'Database Management and Web Design' module was highly relevant to the course, the syllabus content needed to be reviewed.

No matter how up-to-date an education program may be, the extent and speed of changes taking place nowadays in some degree makes existing programs outdated. (Vujic et al. 2008)

The module involved 13 lecture hours, 7 of which were devoted to database instruction and 39 computer lab hours, 20 of which were devoted to database instruction. Course assessment took the form of 50% continuous assessment (databases only) and 50% examination (Web design only).

METHOD

The method includes both ongoing cyclical practitioner-researcher evaluation and change followed by a short survey of learners' comfort levels with various aspects of computers and databases.

As a practitioner-researcher evaluation this study enjoys the advantages, and suffers from the disadvantages, of 'real world' research discussed by Robson (2002). A major disadvantage

was insufficient time: “trying to do a systematic enquiry on top of normal commitments is very difficult”. Also “it is difficult to create a research culture if lecturers teach 18 hours a week and academics are also required to assist in course development and administration” (O’Connor and Baum, 2008).

Robson agrees with Boehm (1980):

much ‘real world’ research is messy: uncontrolled variables abound, predictor and criterion measures interact, alternative hypotheses cannot be ruled out, standard statistical measures cannot be applied without massive violation of assumptions.

However, these difficulties are offset against a substantial reduction of implementation problems and the benefits of practitioner insights in the design, execution and analysis of appropriate studies.

The survey method was decided upon because it could be completed quickly and without much inconvenience to learners preparing for examinations. A short survey questionnaire was designed (see Appendix A) to discover the learners’ comfort levels on a Likert scale with regard to the following:

- Using computers in general.
- Using a database (before completing the module).
- Using a database (after completing the module).
- Discussing database requirements with an employer (after completing the module).
- Discussing database requirements with a database professional (after completing the module).
- Creating a useful database (after completing the module).

Information was also sought about the software learners encountered during their industry experience.

The 2007, 2008 and 2009 learner cohorts were asked to complete the survey. With the exception of the 2009 cohort, the survey was administered after completion of internship.

Module Content Modifications

To reflect the importance of practical skills in Web design and the growing importance of databases in the event industry the module was changed to assess both sections by continuous assessment and examination.

In the interests of future flexibility, reference to specific software packages was replaced by reference to current best practice standards in database and Web design.

The aims of the modifications coincided with those of Hornby et al. (2009), i.e. teaching materials, tasks, and experience should all be:

1. Authentic, real world, and relevant;
2. Constructive, sequential, and interlinked;
3. Provide a challenge, interest, and motivation to learn;
4. Align with each other and the desired learning outcomes; and
5. Require students to use and engage with progressively higher order cognitive processes.

Defranco et al. (2006) point to the importance of organising learning activities so that a cumulative effect can be obtained. Tyler (1949) suggests continuity, sequence and integration as the three methods of organising the learning activities in the curriculum.

As no relevant step-by-step database creation instruction material could be found, a collaborative process was entered into with learners to create such materials. The materials were also informed by the experience of the lecturer in creating the graphic design, database and website for a recent event hosted by the Institute.

Learners provided materials from actual events they had worked on and a 'Family Festival' was chosen to form the basis for the new instruction materials. The festival involved the rental of stalls to stallholders and problems which had actually occurred during real life events were discussed. In order to replicate problems, such as traffic jams during unloading, the fictitious annual Family Festival was located in the nearby medieval town of Carlingford.

Learners used image editing software to design and create individual festival logos which would be used for database materials such as parking permits, registration forms and on the website. They also prepared animations of sponsor logos and individual Web banners. This artwork not only fostered individual creativity but also provided a sense of ownership of the completed projects.

More step-by-step instructional materials were developed to guide learners through creating professional registration forms, incorporating their own logos, and converting these to Adobe portable document format (PDF). They then prepared a website plan reflecting the lifecycle of the event:

- Announcing the forthcoming festival and inviting sponsorship,
- Post-sponsorship but pre-registration,
- Post-registration and
- Post festival.

Four assignments, to be created during computer laboratory sessions, were based on planning a website, creating a website, planning a database and creating a database for the Carlingford Family Festival.

The module was assessed 50% by continuous assessment and 50% by examination. In order to reinforce the core concepts the examination involved planning a website and planning a database but for a different event; if the assignments called for a festival database and website, the examination involved a competition or conference event. The database examination questions also elicited descriptions of how common problems experienced during a given event could be tackled using database reports (name badges, parking permits etc.). This allowed learners to demonstrate that they understood the relevance of the computer laboratory exercises.

The step-by-step database instruction materials version 1, 2007, included an introduction to Microsoft Access with exercises to incrementally remove dependence on the notes when working with database objects such as basic tables, forms, queries and reports. Basic proficiency was achieved in approximately 6 laboratory hours and learners then moved on to create their assignment/project databases.

Lectures were designed to reinforce understanding of these objects and explored database design in terms of database modelling for the Carlingford Family Festival database. The area of Entity Relationship (ER) modelling was introduced.

RESULTS AND DISCUSSION

As change is a process and not an event (Robson, op. cit.) the major outcomes of this process of intervention and change, over the three year period, are outlined below:

INTERVENTION AND CHANGE RESULTS

Intervention and Change 2007

The step-by-step materials acknowledged as relevant by learners worked through them at their own pace during computer laboratory classes with the lecturer acting as facilitator. Learners were encouraged to help each other if they wished.

The assignment to plan a database for the Carlingford Family Festival immediately revealed problems with the delivery of ER modelling concepts and terminology. The major stumbling block was the inability of the lecturer to convey the importance of modelling relationships in a database and also the way in which this was done.

Although learners made real efforts to plan the database, it was clear that the majority were very unhappy as they did not understand the reasons underpinning their database plans.

The database creation assignment was better received as learners were provided with step-by-step materials to work through the assignment and the majority of the class were able to create fully-functioning relational databases for the festival. This clearly provided a sense of achievement, especially as they incorporated their own artwork (festival logos etc.) in the database and printed reports such as parking permits etc.

Overall the result was positive but clearly the delivery methods of database theory would need to be reviewed.

Intervention and Change 2008

The 2007 cohort who had returned from internship and were working on event group projects, requested assistance to create databases (and websites) for their projects. (Learners undertake internship during the second half of their second year, directly after completing the 'Database Management and Web Design' module.) The third year of study includes a module dedicated to the use of industry-specific database software.

These events included a 'battle of the bands', a fashion show and a blind-date competition. The fact that learners volunteered to revisit the materials in this way was appreciated and taken as a vote of confidence in the relevance of the module.

This experience together with their accounts of the internship provided invaluable insights for shaping the database module for the 2008 cohort. The industry was using list management software to support events and none of the internships provided experience with RDBMS. The majority of interns had used Microsoft Excel or Word in their event management experience. For this reason, step-by-step instructional materials were created guiding learners through importing data from Excel/Word into an Access RDBMS. As Microsoft Access can be downloaded and used on a trial basis this would provide the 2008 interns with the opportunity to create and display an RDBMS to their employer without incurring any cost and without having to re-enter long lists of data.

A PowerPoint presentation using animation was created with the aim of overcoming the problem of explaining the importance of relationship modelling in an RDBMS. While this went some way towards clarifying the matter, many learners were still struggling with the concepts involved. To take account of these problems, less emphasis was placed on ER modelling at the planning stage of the RDBMS.

A step-by-step guide to creating a menu driven RDBMS was included and the advantage of such a system in terms of delegation of tasks and reduced training requirements and volunteer retention were explained. (As Sweeney (2007) has found, 98% of all Irish festivals use volunteers).

Intervention and Change 2009

The computer laboratory software was upgraded to Microsoft Office 2007 and the step-by-step instruction materials were re-written (for a talent contest event) to take account of this. One unexpected difficulty emerged during the exercise involving importing data from Excel into Access; learners confused the two applications with each other.

This could be an example of the confusion described earlier by Harrington (ibid.). However, as this had not appeared to happen the previous year it could have been a result of the new ribbon menu's similarity across the Microsoft Office suite of programs. The notes were amended to clarify the distinction between a *spreadsheet* and a database *table*.

The importance, and the difficulty, of clarifying the difference between list or 'flat file' applications and RDBMS applications (in which relationships can be modelled) remained.

A student activity was devised to augment the animated PowerPoint presentation in explaining the importance of relationship modelling in an RDBMS. After the presentation was delivered, the learners were divided into two groups, the RDBMS group and the FLAT-FILE-LIST group. Each group had about fifteen members and put forward two volunteers to compete in a task. A learner was also assigned the role of timekeeper. The RDBMS group was given printouts of the appropriate tables from an RDBMS and the FLAT-FILE-LISTERS were given report printouts such as Contestant Details, Name Badges, Address labels, Award Winners.

The timed task involved adding a new contestant, deleting an existing contestant and updating incorrect details of an existing contestant by simply writing the details on the printouts or crossing them out. The RDBMS group won, completing the task eight seconds before the FLAT-FILE-LISTERS. Upon examination, one of the addresses in the latter groups' printouts was discovered to be inconsistent. During the animated discussion that followed, with each group advocating its file management system, it was clear that some learners had fully grasped the concepts involved and were keen to explain them to their classmates.

Learners described working in groups to unpick the more intricate manoeuvres demonstrated in the step-by-step manual. In order to support this activity a set of narrated screen capture

videos are being prepared. It is hoped that this method of delivery will appeal to a wider range of learning styles.

SURVEY RESULTS

The summary survey results table and the percentage distribution of comfort level with databases table are in Appendix B. The analysis of the research questions 1 and 2 is presented in Appendix C.

Record-keeping Methods used in the Events Industry

The record-keeping systems encountered by learners during their industry experience are summarised in Table 1 below. Forty-five sponsors/employers used list-based systems (either manual or computerised). Seven used Microsoft Access which has the potential to create an RDBMS. Two high-end, specialised RDBMS systems were encountered; one provided online bookings for an Irish golf course and the other, EventForce, is an event management RDBMS catering for MICE type events.

Industry Experience including Internship					
Type of Record-keeping					
Manual	MS Word	MS Excel	MS Access	Don't Know	OTHER
12	10	23	7	2	EventForce Database
					BRS Golf Database

Table 1. Record-keeping Methods encountered during Industry Experience

EventForce originated from a post graduate research project carried out in 2004 by psychologist George Sirius. The project involved analysing the working processes of event management teams to discover how technology could help them in their jobs. The researcher was ‘shocked’ to discover that the teams were using spreadsheets and seized the opportunity to develop an RDBMS solution. The EventsForce company operates globally, managing thousands of events per year, and is due to expand into the U.S. (Sirius, 2009).

Weber and Ladkin (2005) predicted that the nature of supplier services is likely to change in the future, with less on-site and more on-line registration and payment already being in evidence.

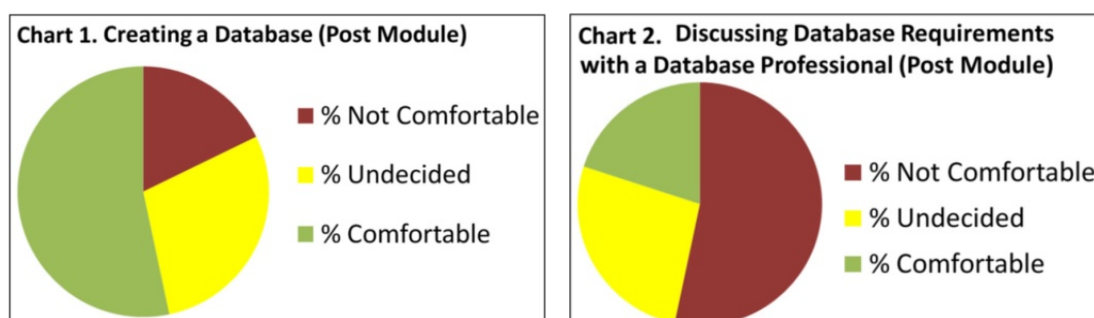
Online registration services for MICE events is a growth area with videoconferencing being seen as a complementary service. Casanova et al. (2006) believe videoconferencing will not replace face-to-face meetings. Weber and Ladkin (ibid.) believe that this will not happen in the near future. However, disruptions to global travel (volcanic ash, terrorism, oil reserves, climate change and economic recession) may shift the balance.

Research Question 1

Would a learner be more comfortable creating a database him or herself than discussing database requirements with a database professional after completing the module?

Since the test statistic is greater than the critical value, the null hypothesis should be rejected, i.e. it can be concluded with 95% confidence that the comfort level is significantly higher for a learner creating a database him or herself than discussing database requirements with a database professional.

Law (2001) observes that it seems that there is little communication between hotel managers and technical IT experts and wonders "How can a higher education institute relate its IT courses to the world of the hospitality industry?" It seems that even when an IT course is related to its target industry there is a reluctance to engage with Information Technology professionals.



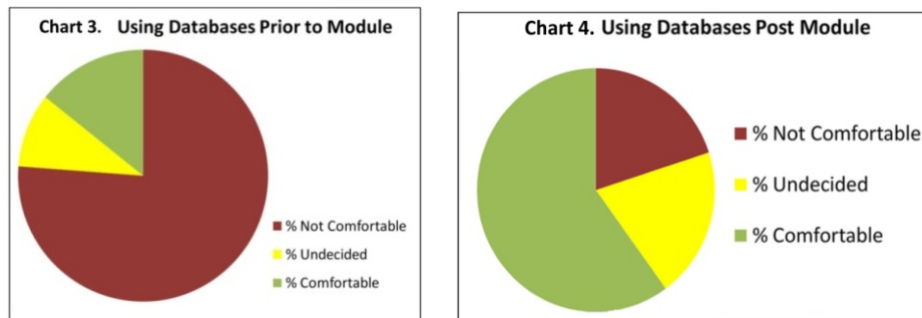
This reluctance should be examined and understood if the innovation initiative is to be retained within the tourism and hospitality sector.

Research Question 2

Is a learner's comfort level with using databases the same before and after completing the module?

Since the test statistic is greater than the critical value, the null hypothesis should be rejected, i.e. it can be concluded with 95% confidence that the comfort level is significantly higher for a learner using a database after completing the module than before.

This is a desirable outcome and is supported both by learners' examination performance and by the voluntary return to the materials of the 2007 cohort while working on their projects in their third year. It is hoped that the additional video support materials may improve this result in the future.



LIMITATIONS OF THE RESEARCH

Not only does this study suffer from the major disadvantages of practitioner research in general which have been identified by Robson (op. cit.) above, it is based on a very small sample size, in a single course, in a single location and from the point of view of a single researcher.

This research was conducted very much in the spirit of 'the best is oftentimes the enemy of the good' as the perfect conditions for such a study would be unlikely to arise. Any results must be considered in this context and conclusions drawn from statistical results are at best tentative.

RECOMMENDATIONS FOR FUTURE RESEARCH AND CONCLUSION

Any attempt to seize the innovation initiative for the tourism and hospitality sector must be underpinned by a clear understanding of the important role played by the RDBMS in any product or service involving mass customisation.

Innovation also frequently involves combining existing systems in new ways:

- Networks, in combination with the GDS RDBMS, produced remote booking.
- The Internet, in combination with an RDBMS, produced online booking.
- The Internet, in combination with an RDBMS, produced social networking.
- Wireless technology, in combination with a PMS RDBMS, produced remote check-in.
- Intelligent Local-Based Information (ilbi) systems combine position-sensing wireless technology with an RDBMS to provide event/location specific information. (Peters et al. (2010) piloted such a system in Innsbruck during the European Football Championships).

To enhance the relevance of event management course materials it would be desirable to set up a joint research project with local industry analysing and evaluating current event offerings in terms of RDBMS support in general and in the area of on-line registration and payment in particular. As observed by O'Connor and Baum (2008):

Departments of tourism and hospitality should carry out research to meet the needs of the regions, as Institutes of Technology were formed for this sole purpose. Researchers should incorporate their expertise in their programme delivery.

Also, as observed by Duffy (2008):

Unsurprisingly, ICT training has emerged as one of the main methods of overcoming barriers to ICT adoption. The rural location of many of the businesses involved in this study, indications of low levels of ICT adoption and findings in relation to barriers to ICT usage are not unique to the West and North West of Ireland and are reflected countrywide. Such factors strengthen the case for appropriate ICT training programmes to be developed that will both have meaning and benefit for SMTE owners/managers in general and micro tourism enterprises in particular.

Research is necessary to determine:

- What technology is used to support non-MICE type special events in the industry?
- What technology, if any, is used to support MICE type events in the industry?
- To what extent are RDBMS taught on tourism and hospitality courses?
- To what extent are RDBMS taught on event management courses?

To start to fulfil the need for ICT training identified by Duffy (2008) above, an integrated course could be delivered locally providing motivated practitioners with the relevant IT skills (image editing, RDBMS and Web) to host a special event, tailored to their own circumstances. Ideally, such a course would be followed by an innovation workshop during which micro and SMTE operators would use their new skills to identify improvements to their existing processes, products and services, and possibly develop innovations in these areas.

The experience gained by such ventures could be incorporated into program delivery as suggested by O'Connor and Baum (ibid.), whilst at the same time reducing the recognised barriers to ICT diffusion among micro and SMTEs noted by Duffy (ibid.).

Meeting current challenges facing the tourism and hospitality industry in terms of ICT adoption with customised training would open up future opportunities in the sector.

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APPENDIX A - QUESTIONNAIRE

This questionnaire will be used to determine the usefulness (or not) of the Database section of the Database Management and Web Design module to you as future event management professionals.

Please answer as truthfully as possible as your honest feedback will be helpful to future students on this course.

I am very comfortable using computers in general

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you have completed your Internship please answer the following:

Name of business _____
 Country _____
 Type of business (Hotel etc.) _____
 Position Held _____

During your Internship did your employer keep track of customer records using:

Hand written records	MS Word	MS Excel	MS Access	Don't Know	Other (please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

If you have other industry experience please answer the following:

Name of business _____
 Country _____
 Type of business (Hotel etc.) _____
 Position Held _____

Did/does your employer keep track of customer records using:

Hand written records	MS Word	MS Excel	MS Access	Don't Know	Other (please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Skip this question unless you have used databases before studying the Database and Web Design module.

Before studying the Database and Web Design Module I was comfortable using databases

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name the database software used (if known) _____

Having completed the Database and Web Design module please answer the following:

I am comfortable using databases

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I would be confident discussing database requirements with my employer

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I would be confident discussing database requirements with a database professional

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I have the confidence to create a useful database myself

Strongly Disagree	Slightly Disagree	Undecided	Slightly Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you very much for taking the time to fill out this survey.

APPENDIX B - SUMMARY OF RESULTS

	General Computer usage Comfort Level (1 to 5)	Comfort Level with Databases				
		Prior to Module	Post Module			
		Comfort (1 to 5)	Comfort (1 to 5)	Discussing with Employer (1 to 5)	Discussing with DB professional (1 to 5)	Confidence to create a DBMS (1 to 5)
Average Comfort Level	4.3	1.9	3.4	2.9	2.4	3.3
Standard Deviation in Comfort Level	0.9	1.2	0.9	1.1	1.1	1.1
Number of Respondents	47	21	45	45	45	45
There were 40 female respondents and seven male respondents						

Table 2. Survey Results Summary

Learners comfort with using databases	Prior to Module	Post Module			
	Comfort (1 to 5)	Comfort (1 to 5)	Discussing with Employer (1 to 5)	Discussing with DB professional (1 to 5)	Confidence to create a DBMS (1 to 5)
% Not Comfortable (i.e. level 1 or 2)	76%	20%	40%	53%	18%
% Comfortable (i.e. level 4 or 5)	14%	60%	33%	20%	53%
% Undecided (i.e. level 3)	10%	20%	27%	27%	29%
Number of Respondents	21	45	45	45	45
There were 40 female respondents and five male respondents					

Table 3. % Distribution of Comfort Levels with Databases

APPENDIX C - RESEARCH QUESTIONS

QUESTION 1

Would a learner be more comfortable creating a database him or herself than discussing database requirements with a database professional after completing the module?

The Null Hypothesis – comfort levels are the same in both cases

Alternative Hypothesis – comfort levels are not the same in both cases

$x_1 = 3.31$ $x_2 = 2.44$ $\sigma_p^2 = 1.15$ $n_1 = 45$ $n_2 = 45$	Test statistic $t = \frac{x_1 - x_2}{\sqrt{(\sigma_p^2(\frac{1}{n_1} + \frac{1}{n_2}))}} = 3.85$
The critical value at the 95% confidence level for a two-tailed t test (f = 88) is 1.99	

Since the test statistic is greater than the critical value, the null hypothesis should be rejected, i.e. it can be concluded with 95% confidence that the comfort level is significantly higher for a learner creating a database him or herself than discussing database requirements with a database professional.

QUESTION 2

Is a learner's comfort level with using databases the same before and after completing the module?

The Null Hypothesis – comfort levels are the same in both cases

Alternative Hypothesis – comfort levels are not the same in both cases

$x_1 = 1.91$ $x_2 = 3.38$ $\sigma_p^2 = 1.03$ $n_1 = 21$ $n_2 = 45$	Test statistic $t = \frac{x_1 - x_2}{\sqrt{(\sigma_p^2(\frac{1}{n_1} + \frac{1}{n_2}))}} = 5.4$
The critical value at the 95% confidence level for a two-tailed t test (f = 64) is 2.00	

Since the test statistic is greater than the critical value, the null hypothesis should be rejected, i.e. it can be concluded with 95% confidence that the comfort level is significantly higher for a learner using a database after completing the module than before.