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A Survey of Student Attitudes: Database Competition NCC 2003

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Abstract

This paper describes the inaugural Database Design and Implementation contest that was held at the 2003 *National Collegiate Conference (NCC)*, which is sponsored by the Association of Information Technology Professionals (AITP). The contest was divided into two major parts: a modeling component and an implementation component. Although the database competition was new for this year, the contest proved to be very popular, with over 80 teams from across the country competing. This paper will describe the contest and give the results of an exit survey administered to the contest participants. With this survey we gathered data concerning demographics of the participants, as well as data concerning the problem statement, such as the level of difficulty, amount of time available, clarity of instructions, and so forth. We will describe the database contest, present the results of the survey, and give some conclusions that can be drawn from those results.

Keywords: database competition, Access competition, contest, student attitudes

1. INTRODUCTION

The Database Design and Implementation contest made its debut at National Collegiate Conference (NCC) 2003, which is sponsored by the Association for Information Technology Professionals (AITP). NCC 2003 took place at Purdue University in West Lafayette, Indiana on March 27-29 (http:/aitp.tech.purdue.edu/ncc). Participants from 84 colleges and universities from around the country participated in the conference, which included keynote speakers, break-out sessions, and student contests.

Contest events included programming languages, such as Visual Basic, COBOL, C++, and Java. Other student contests were held in the areas of network design, systems analysis and design, and web design. Students also submitted papers prior to the conference to be judged in the Student Paper Competition.

Prior to the contest, organizers had decided that the contest should include both a database modeling component and an implementation component. The implementation would utilize Microsoft Access 2002, as this database system is universally available at participating institutions.

This paper will describe the contest and its rules, an exit survey administered to the contest participants, and the results of the survey. The results include the demographics of the participants, as well as their attitudes concerning certain aspects of the contest, such as length of the problem, the level of difficulty. We will analyze the results for the two major components of the contest, i.e. modeling and implementation components. Cross tabulations are performed for some items, grouping the students into two categories: (1) those who had completed less than 24 hours of computing classes, and (2) those who had completed 24 hours or more computing classes.

Instructors of database courses may find this paper helpful in learning about the database competition and what topics/skill sets are needed by students who wish to compete in the future.

2. CONTEST RULES

The following excerpt from the contest rules describes these two components and the concepts and skills that were to be tested:

The implementation component of the competition will be in Microsoft Access 2002. After a team has completed the design component and turned in that design for scoring, they will receive the Access database, which will contain the populated tables only. The competition Problem Statement:

- Will require the students to draw the ER diagram (entities, relationships, cardinality, and optionality) and to specify a relational schema, with all keys indicated
- Will require students to perform operations on Access tables, create queries of various types, and develop custom forms, reports and data access pages.
- Will require students to develop macros, switchboards, and event procedures.
- Will describe an application that can be designed and developed in approximately 3 hours
- The judging will use the following for determining each team's score: Design Component (30%), Production Component (70%)

3. THE SURVEY

Because this was the first time for this contest to take place, the organizers wanted to get some feedback from the contestants. An exit survey was administered to each student as he or she completed the contest and turned in his or her solution for judging. This is a brand new survey instrument, therefore there is no statistical data regarding validity and reliability of this instrument.

The research instrument consisted of a five point Likert scale, with neutral mid-point. The survey contained five groups of questions. The first group of questions concerned student demographics, such as age, gender, and number of computing classes (CIS, MIS, CS) completed. The second group of questions gathered data concerning the level of difficulty, amount of time available, clarity of instructions, the lab environment (equipment, lighting, etc.), and the length of the overall problem. The third group of questions focused on the modeling component; the fourth group of questions focused on the implementation (Access) component. The last set of questions concerned the level of difficulty of the two components. The survey can be viewed in Appendix A.

3.1 Demographics

The survey was completed by 96 respondents, 62 males (65%) and 34 females (35%). Only 6% of the respondents worked alone, where 94% were in 2 person teams. The respondents had completed an average

of 21 hours of computing classes (i.e. seven classes), either in CIS, MIS, or Computer Science. Unreasonable responses were not included when calculating the average. A response of 75 or above for "Total number of Computing Classes" was consider unreasonable for this question; this response indicates that the student misread the question as "Total number of classes", i.e. total of all hours pursued, not just computing classes.

The last question in this group asked the student to list all *database* classes and the *level* (Freshman, Sophomore, Junior, Senior) that he or she had completed. The results of this question are shown in Table 1 below.

Class/Level	Number indicated
Introduction to Database Concepts (Freshman and Sophomore)	19
Access (all levels)	25
SQL, SQL Server, or MySQL (all levels)	11
Oracle (all levels)	18
Database Design and Administration (Junior and Senior)	31
Data Warehousing or Data Mining (Senior)	3

Table 1. Database Classes Completed by Respondents

Because this question required the student to fill in a response, rather than select from a list of choices, we received a wide variety of responses and many students left it blank. Some students indicated more than one class. In addition, some indicated which database system they used (e.g. Access, Oracle, SQL Server), whereas some students simply wrote "Junior" or "Senior". We coded "Junior" and "Senior" as *Database Design and Administration*, which is a commonly used title for database courses at this level. Responses of "Freshman" or "Sophomore" with no other explanation were coded as *Introduction to Database Concepts*.

As Table 1 shows, there were 25 students who listed Access, as opposed to 18 indicating Oracle. For next year, we will not leave this as an open-ended response question, but rather will have a list of choices from which the student may select. There is some discussion among the organizers concerning the use of Access versus Oracle for the contest, and we would like to have better data upon which to make an informed decision.

3.2 Results of the Study

The following table contains the results of the survey. The question is an abbreviated version of the question given on the survey instrument. We have combined the first three categories together (Strongly Agree, Agree, and Neutral) as "agree or neutral" and combined Disagree and Strongly Disagree as "disagree", in order to summarize the student responses.

Overall contest:	% Agree or neutral	% Disagree
Problem statement was well organized.	80.2	19.8
The instructions were clear.	77.1	22.9
I was familiar with most Access operations.	65.6	34.4
I had enough time to complete most tasks.	46.9	53.1
The computer equipment was adequate.	76.0	24.0
The room environment was good.	58.3	41.7
Conceptual Modeling Component:		
Instructions were clear for this part.	83.3	16.7
Length of problem was too short.	47.9	52.1
Length of problem was too long.	65.6	34.4
There was enough time to complete this part.	77.1	22.9
Access Implementation Component:		
Instructions were clear for this part.	76.0	24.0
Length of problem was too short.	44.8	55.2
Length of problem was too long.	87.5	12.5
There was enough time to complete this part.	53.1	46.9

Table 2: "Agree or neutral" vs. "disagree"

Most of the respondents felt as though the overall problem statement was well organized (80.2%) and the instructions were clear (77.1%). Approximately two thirds (65.6%) were familiar with most of the Access operations required; however less than half (46.9%) felt as if they had enough time to complete most tasks. Most felt the computer equipment was adequate; however only 58% thought the room environment was adequate. This is reflected in the comment section; there were several negative comments concerning the environment, such as inadequate space and uncomfortable room temperature.

Overall, the respondents felt that each component (modeling and implementation) was too long. However, there was a significant difference when comparing Part I (modeling) and Part II (implementation). Thus significantly more students felt that Part II was too long.

	Agree or neutral	**Disagree**
Length of Part I too long	60 (64.5%)	33 (35.5%)
Length of Part II too long	81 (87.1%)	12 (12.9%)
	chi-square = 11.726, df=1, p = 0.0006	

Table 3. Comparison of Lengths Part I and Part II

We analyzed the question concerning adequate time to complete each component. The results show that the majority of respondents (78%) felt that they had enough time to complete Part I, but only about half (50.5%) felt as though they had enough time to complete Part II. This is shown in Table 4 below.

	Agree or neutral	**Disagree**
Part I adequate time	71 (78%)	20 (22%)
Part II adequate time	46 (50.5%)	45 (49.5%)
	chi-square = 13.785, df=1, p = 0.0002	

Table 4. Comparison of Adequate time to complete Part I and Part II

The results shown in Table 3 and Table 4 are not surprising, due to the fact that the Access component was more challenging and was indeed longer than the modeling component. The contest organizers had estimated that the competitors would probably spend approximately one-third of the time on the modeling component, and approximately two-thirds of the time on the Access component. The modeling component was administered first, therefore any team that took more than about an hour to complete this component, would most likely run out of time to complete the Access component.

3.3 Level of Difficulty

The final two questions of the survey asked the student to indicate their feelings about the difficulty of each component of the competition (Part I Modeling and Part II Implementation) using the following scale: 1-Very Easy, 2-Moderately Easy, 3-Just about right, 4-Moderately Hard, or 5-Very Hard. We performed a cross tabulation grouping the students into two categories: (1) those who had completed less than 24 hours of computing classes, and (2) those who had completed 24 hours or more computing classes.

We felt it would be beneficial to analyze the responses based on the student's success in the competition. However, the survey was anonymous and we therefore had no connection between the survey and the problem solution. However, we could investigate whether there was a difference between the response of the student with more computing experience and that of a less experienced student. We felt that, in general, a student with more computing hours would have more experience, and be more likely to be a serious contender in the competition. In the graph shown below, Group 1 refers to the group of students with less than 24 hours of computing classes, and Group 2 refers to the group with 24 hours or more.

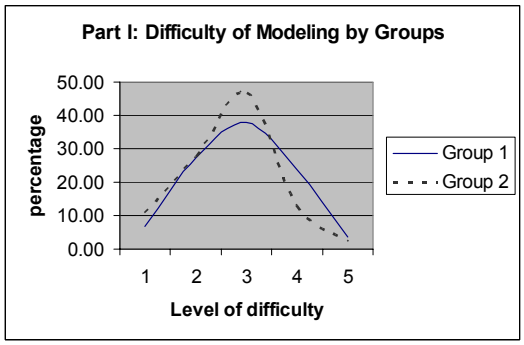

Figure 1: Level of difficulty of Modeling Component

The graph shown in Figure 1 indicates that most students in both groups felt that the contest level of difficulty was just about right for the Modeling component. Statistically, there was no significant difference between the two groups for this question. The graph shows that there was a slightly higher percentage of Group 1 felt that it was Moderately Hard or Hard, which is understandable since these students have taken fewer computing courses. This result is not unexpected, as data modeling is typically covered in most database courses, even those at the introductory level. Therefore most database students have had exposure to Entity-Relationship Diagrams or other modeling techniques.

The following graph depicts responses from the same groups (Group 1 and Group 2) for the level of difficulty of Part II, the Access Implementation component. As can be seen by comparing the graph in Figure1 with the graph in Figure 2, the graph in Figure 2 is skewed to the right, indicating that more students in both groups felt that Part II, the Access Implementation component, had a higher level of difficulty.

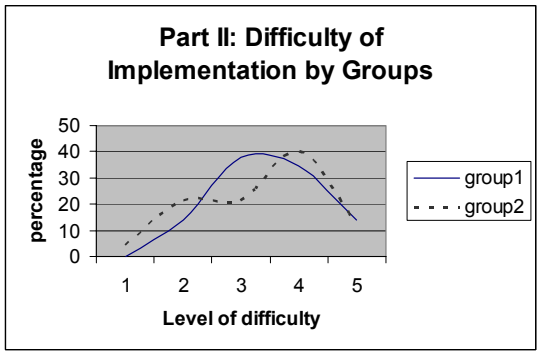

Figure 2: Level of difficulty of Implementation Component

Fewer of the inexperienced students felt the level of difficulty was just right, with slightly more of these students indicating moderately hard to hard. Again, this was an expected result, as this component required thorough and detailed knowledge of Access to complete. Those students who have taken courses using another database management system, such as Oracle or SQL Server, would find this part of the contest very difficult. Students who had taken database concepts, such as design and administration, without hands-on experience with Access, would also find this component to be difficult.

Because only 58% of the respondents felt the room environment was suitable, and also because several negative comments were made concerning room temperature, adequate seating, etc., we performed a cross tabulation to see if there was a difference in the responses between the students who felt the room environment was adequate as opposed to those who thought it inadequate. We examined all of the questions, including the Level of Difficulty questions, shown above in Tables 4 and 5; however, there we found no significant difference between the responses given by the two groups.

4. CONCLUSION

The first Database Design and Implementation competition was held at the AITP National Collegiate Conference 2003 at Purdue University, West Lafayette, Indiana. Most of the comments from conference organizers, student participants, and faculty advisors were highly favorable. Although there were some negative comments concerning the room accommodations, this was a factor

that we (the competition organizers) could not control. The lack of space and adequate seating was due to the fact that we had a large number of teams who did not pre-register for the competition, but rather signed up on site. Perhaps it was curiosity or the fact that this was the first time this competition had been held, but the database competition had the second largest number of participants for any of the 2003 NCC contests.

Based on the good comments and the results of the survey, we feel the competition was a great success. We have a good foundation upon which to build next year's contest. What do the results of the survey tell us and how can we make improvements for next year. First, the discussion of Oracle versus Access will continue, but for now, the results show that more students have Access than Oracle. We will improve the survey for next year to provide more accurate data concerning this question. Secondly, we did a good job with organizing and giving instructions in the problem statement. We should continue along the same lines when developing next year's problem statement.

The results of the survey show that a large number of students felt that the Access implementation component was too long, and that they did not have adequate time to complete all tasks. If this were an examination for a typical university class, then we would agree that the exam should be adjusted so that most students could complete it in a reasonable amount of time. However, this is not an examination in a class; this is a national competition. The purpose is to find out which team can perform the most tasks correctly in the time allocated. Therefore there the problem statement will be too long for many teams to complete. We will not shorten the length of the problem for next year's competition, as five teams in this year's competition were able to complete all of the tasks, with varying degrees of correctness.

We look forward to NCC 2004, which will be held in Omaha, April 1 – 4, and hope that this paper will help those database instructors who would like to send a team to compete in the database contest.

Appendix A

2003 AITP National Collegiate Competition

Purdue University
DATABASE COMPETITION
Exit Survey

Please take a few moments and fill out the following survey. Your responses are totally anonymous and will help AITP prepare future Database competitions. Thank you for your participation!

Demographics

1. Sex: ___ Male ___ Female
2. Team makeup: _____ 2-member team ___ Worked alone
3. Total number hours of computing classes (CIS, MIS, CS) completed: _____
4. List all Database classes and the level (Freshman, Sophomore, Junior, Senior) that you have completed:

For this group of the statements, circle the number that bests describes your attitude:
1.Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree

Overall contest:

— The problem statement was well organized.
— The instructions were clear.
— I was familiar with most Access operations that were required.
— I had enough time to complete most tasks.
— The computer equipment was adequate for the contest.
— The room environment was good (comfortable, well-lit, quiet).

Conceptual modeling phase (Part I: ER diagram and schema):

— Instructions were clear for this part.
— The length of the problem was too short for this part.
— The length of the problem was too long for this part.
— There was enough time to complete this part.

Conceptual modeling phase (Part II: Access Implementation):

— Instructions were clear for this part.
— The length of the problem was too short for this part.
— The length of the problem was too long for this part.
— There was enough time to complete this part.

Circle the number that bests describes each part of the competition:
1.Very easy 2. Moderately Easy
3. Just about right 4. moderately hard 5. Very hard

— The ER Modeling phase
— The Access Implementation Phase

Dr. Lissa Pollacia, BellSouth Endowed Professor and Professor of Computer Information Systems, holds a doctorate in Computer Science from the University of Louisiana at Lafayette. She has over twenty years of teaching experience, and has served as Principal Investigator for several grants. She is a leader in the area of Web-based instruction and has been instrumental in developing courses for delivery over the Internet. She currently teaches CIS courses in the area of database management systems (Access and Oracle) and VB.NET programming. Dr. Pollacia has published numerous works in journals and conference proceedings, as well as contributed to textbooks in Computer Science.

Dr. Pam Miller has taught at Northwestern State University for two years where she is Associate Professor of Operations Management in the College of Business. She received her Ph.D. in operations management from Louisiana State University. Her teaching and research interests include operations management, purchasing, and supply chain management.

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Dr. Nola McDaniel has taught at McNeese State University for fifteen years where she is Professor of Statistics and Assistant Department Head in the Department of Mathematics, Computing Science and Statistics. She received her Ph.D. in statistics from the University of Southwestern Louisiana.