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ABSTRACT

The objective of this paper is to discuss the survey as a research method based on three questionnaire surveys developed and administered in educational settings: (1) a survey exploring the status aspiration and gender awareness of undergraduate women completed by 62 respondents; (2) a survey of computer-assisted instruction completed by 111 undergraduate women; and (3) a Diversity and Multiculturalism Questionnaire to determine faculty attitudes completed by 104 teachers. These surveys were developed for different research purposes but they reveal common issues and concerns, especially the issues of designing surveys, measuring survey reliability and validity, and reporting on surveys. (SLD)

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Questionnaire Research in Higher Education

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Questionnaire Research in Higher Education

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Abstract

The objective of this paper was to discuss a survey as a research method based on the three questionnaire surveys developed and administered in educational settings: Undergraduate Women Questionnaire Survey was conducted in 1998 to explore undergraduate women's status aspiration and gender awareness; Computer-Assisted Instruction Questionnaire Survey was conducted in 1995 to identify and to prioritize the factors influencing the university faculty members' use of computers in their teaching; and Diversity and Multiculturalism Questionnaire Survey was conducted in 2000 to determine the attitudes of the university faculty toward multicultural education. These questionnaire surveys were developed for the different research purposes but revealed the common issues and concerns, in particular, in terms of designing surveys, measuring survey reliability and validity, and reporting on surveys.

There are many ways to obtain research data from people. The most common methods are interviews (including focus groups and personal interviews) and surveys of various kinds (including telephone surveys, mail surveys, and e-mail surveys). In general, a survey can be defined as follows: "A survey is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behavior" (Fink, 1995, p. 1). Survey questionnaires provide an efficient way to collect data. Questionnaires can: (i) reach large numbers of people at relatively low cost; (ii) ensure anonymity; and (iii) be written for specific purposes. The purpose of this paper is to discuss questionnaire research in higher education on the basis of three questionnaires that have been previously developed and administered by the present author. The first section of the paper is a brief description of each questionnaire, including tables of descriptive statistics. The second section is a discussion of certain aspects of questionnaire research (including the design of questionnaire items, collecting and analyzing the data, and writing reports). The paper concludes with a discussion of the validity and reliability of questionnaire research.

Three examples of questionnaire research

Faculty computer-assisted instruction questionnaire

This survey was conducted to identify and prioritize the factors that influence the use of computer-assisted instruction (CAI) by faculty members in the course of their teaching. For this purpose a questionnaire was administered to the faculty of Nanyang Technological University

(NTU) in Singapore. The results obtained from 62 respondents indicated that the two most important facilitators in the use of such software were "teachers' knowledge and skills in the CAI technology," and "the availability of hardware and software". Among inhibiting factors, "lack of teachers' time," and "lack of technical support" were the most important. Table 1 presents the summarized findings of this survey.

Table 1. Facilitators and inhibitors in the faculty use of CAI (N = 62)

Rank	Facilitators	M	SD
1	Teacher's knowledge and skills in technology	4.32	0.95
2	Availability of hardware and software	4.29	1.05
3	Commitment by those involved in CAI	4.26	0.96
4	Availability of software information	4.23	0.78
5	Systematic planning for the use of CAI	4.21	0.83
6	Support from higher administration	4.16	0.96
7	Availability of teachers' time	4.13	0.97
8	Availability of commercial software.	4.11	0.96
9	Universities' formal policy for computer use	4.03	1.04
10	Availability of CAI authoring tools	4.00	0.94
11	Collaboration among developers and users	3.98	1.05
12	Support from the government.	3.94	0.74
13	Demonstration of other schools' CAI uses.	3.84	0.85
14	Integration of CAI with schools' goals	3.81	0.96
15	Recognition/motivation of the faculty	3.53	0.92
	Average	**4.06**	**0.61**
Rank	**Inhibitors**	**M**	**SD**
1	Lack of teachers' time for CAI	4.08	0.95
2	Lack of technical support	4.06	0.94
3	Cost of hardware (financial resources)	3.98	1.11
4	Lack of teacher training for computer use	3.97	0.97
5	Teachers' resistance to change	3.92	1.03
6	Lack of quality and suitable software	3.90	1.13
7	Incompatibility of teaching method with CAI	3.89	0.89
8	Lack of administrative support	3.85	1.02
9	Scheduling problems in use of computers	3.76	1.07
10	Lack of appropriate hardware	3.74	1.19
11	Lack of suitably equipped classrooms	3.71	1.14
12	Scepticism on the effectiveness of CAI	3.56	1.11
13	Lack of access to software information	3.55	0.99
14	Apprehension of teachers in teaching	3.55	1.04
15	Rapid changes in hardware and software	3.52	0.82
14	Lack of information on CAI potential	3.45	1.05
17	Lack of tests to evaluate CAI	3.45	0.86
18	Assumption that CAI needs special curricula	3.40	1.09
	Average	**3.74**	**0.63**

Undergraduate women's aspirations questionnaire

This survey was conducted to determine the status aspirations of undergraduate women at the University of Guam (UOG). In particular, it explored their awareness of gender equality in employment, and how these affect their academic and social aspirations. A random sample of 350 women representing the culturally diverse setting of the study was selected from the degree and non-degree programs of UOG. The sample received the mail questionnaire, and the usable response rate was 32% (N = 111). The respondents indicated their strong desire for pursuing occupational careers and earning their own incomes. They did not perceive gender discrimination as being a significant impediment in employment. The results are presented in Table 2.

Table 2. Priorities of status aspirations for undergraduate women (N = 111)

Item	Aspiration	M	SD
	How important is it for you ...		
1	To graduate from university (your own perspective)	4.68	0.63
2	To graduate from university (your family's perspective)	4.27	0.94
3	To go to professional school (e.g., law; medicine)	3.23	1.15
4	To go to graduate school (master's degree)	3.76	1.06
5	To go to graduate school (doctorate)	3.12	1.17
6	To become financially independent (your own perspective)	4.47	0.77
7	To become financially independent (your family's perspective)	4.00	1.03
8	To have a prestigious occupation	3.80	1.14
9	To have a profitable job (make lots of money)	4.01	0.88
10	To get married in your 20s or early 30s	3.21	1.27
11	To have and raise your own child	4.02	1.11
12	To combine home and work roles	4.05	0.99
13	To attain a position of great influence	3.77	1.09
14	To contribute to society through working	4.00	0.91
15	To achieve satisfaction through working	4.43	0.72
16	To marry a man with a high social standing (your own perspective)	2.75	1.22
17	To marry a man with a high social standing (your family's perspective)	2.84	1.21
18	To have a family and have a career at the same time	4.02	1.04
19	To you that your child goes to a prestigious university	3.57	1.21
20	To be involved in government and politics	2.58	1.06
21	To enter the business world	2.96	1.18
22	To enter the academic world	3.62	1.02
23	To work in social welfare or health care	3.24	1.22
24	To engage in church affairs	3.16	1.01
25	To make a connection to improve your social standing	3.42	1.08
26	To choose friends from among those with whom you associate	3.50	1.05
27	To attain status (wealth, power, prestige)	3.25	1.15
38	To become a mentor for the next generation	3.88	1.01
29	To be important to society in your life	3.16	1.04

Faculty multicultural education questionnaire

This survey was conducted to determine faculty members' attitudes to multicultural education at the University of Guam, with a general focus on diversity, ethnicity, and pluralism. Questionnaires were sent to the entire full-time faculty through the campus mail. The usable return rate was 51% (N = 104). Results of the survey indicated that 71% of the respondents agreed with the theorized notion of pluralism—that cultural and ethnic diversity is an asset that enriches the learning process. The respondents, regardless of gender, age, ethnic background, or teaching experience, rated diversity and multiculturalism highly. The results reflected Guam's ethnic and cultural diversity, and confirmed that multicultural education is an important facet of curriculum development in higher education. The results of this survey are presented in Table 3.

Table 3. Rank order of five elements of teachers' knowledge base

Relationship skills	**M**	**SD**	**N**
To be friends with someone from a different culture in Guam or anywhere	3.76	1.02	104
To collaborate on research and teaching with colleagues from the same cultural and ethnic backgrounds as your own	2.81	1.25	103
Internal consistency reliability = 0.2848			
Community knowledge			
To understand or be aware of other cultures and heritage	4.45	0.88	104
To be exposed to a culturally diversified environment	4.19	0.98	104
To take the time to learn about students' backgrounds and cultural characteristics.	4.13	0.88	104
To respect and accommodate students' individual and culture-based learning styles	4.04	0.90	104
Internal consistency reliability = 0.7724.			
Empathy			
To support the academic success of students from different cultural and ethnic backgrounds than your own	4.57	0.80	104
To challenge and avoid using stereotypes in your teaching	4.45	0.94	104
To become a culturally sensitive and responsive teacher	4.52	0.78	103
To become informed about cultural and ethnic differences	4.29	0.81	104
(Internal consistency reliability = 0.7935)			
Cultural conflicts			
To eradicate prejudice in your professional life	4.71	0.71	104
To eradicate prejudice in your personal life	4.64	0.79	104
To employ Eurocentric pedagogy in your teaching.	3.30	1.00	101
To associated with people from the same cultural and ethnic backgrounds as your own	3.21	1.15	104
Internal consistency reliability = 0.5078			
Relevant curriculum			
To provide an environment for the free and open expression of ideas and beliefs	4.62	0.72	104
To use culturally relevant examples and materials in teaching	4.33	0.85	104
To integrate multicultural perspectives in your teaching	4.22	1.01	104
To be exposed to a culturally diversified environment	4.19	0.98	102
(Internal consistency reliability = 0.7640)			

Designing, analyzing, and reporting questionnaire research

Fink (1995) has identified the following six requirements for a useful questionnaire survey:

- Specific, measurable objectives;
- Sound research design;
- Sound choice of population or sample;
- Reliable and valid instruments;
- Appropriate analysis; and
- Accurate reporting of the results.

Each of these is considered below in relation to the surveys under consideration in the present paper.

Specific, measurable objectives

With respect to the first criterion noted above, each of the three questionnaires presented here had specific, measurable objectives. Preparing such objectives is the first step in good questionnaire research, and Patten (2001) has made the following pertinent observations in this regard: (i) if the objective is too broad, it is difficult to provide questionnaire items that are effective and relevant; (ii) the objectives, as developed, should be reviewed by external experts before proceeding; and (iii) the literature relevant to the objective should be thoroughly reviewed.

Sound research design

With respect to the second criterion noted above (sound research design), Fink (1995, p. 3) has observed that a survey design is "a way of arranging the environment in which a survey takes place." The three questionnaires discussed in the present paper all used a cross-sectional type of design, and were relatively simple (ranging from three to six pages). In designing the questionnaire, account was taken of the basic question of the feasibility of administering the questionnaire to the particular population of interest, and the questionnaire design was modified appropriately.

A Likert-type was used in all three questionnaires under discussion in the present paper. Likert scales are the most frequently used tools in questionnaires of this type. They allow

participants to respond to each question in terms of five degrees of agreement (usually ranging from 1 = "strongly disagree" to 5 = "strongly agree"). In these questionnaires, each response was given a numerical score to reflect weighting, and the scores were totalled to measure the respondent's attitude or perception. In passing, it should be noted that in designing Likert-type scales, Patten (2001) has emphasized that it is better to use terms such as "almost never" and "almost always" for item choices, because few things in life are definitively "never" or "always."

Sound choice of population or sample

With respect to the third criterion noted above (sampling), for the faculty multicultural education questionnaire, the population and sample of the study was the entire UOG faculty. In the case of the faculty computer-assisted instruction questionnaire, the division of Education had 59 faculty members (40% male). Of 208 faculty members in Business, 75% were male. All members of the faculty of Education received the questionnaire. To match this sample size, 59 faculty members of Business were randomly selected. A random sampling procedure was used for the undergraduate women aspirations questionnaire; and the sample was fairly representative of the population (see Table 4).

Table 4.1 Undergraduate enrolment (1998 Spring Semester)

Sex	Number	Percentage
Male	1,374	(39%)
Female	2,146	61%
Total	3,520	100%

Table 4.2 Population and sample comparison

	Population	Sample
Ethnic Background		
Chamorro	918 (42.8%)	49 (44.1%)
Asian Philippines	663 (30.9%)	42 (37.8%)
Asian Others	192 (8.9%)	10 (9.0%)
Micronesian	111 (5.2%)	3 (2.7%)
"Stateside" American	190 (8.9%)	3 (2.7%)
Other	72 (3.4%)	4 (3.6%)
Total	2,146 (100%)	111 (100.0%)
Age		
21 or less	753 (25.1%)	45 (40.5%)
22–24	499 (23.3%)	29 (26.1%)
25–27	269 (12.5%)	12 (10.8%)
28–30	154 (7.2%)	4 (3.6%)
31 or over	470 (21.9%)	21 (18.9%)
Total	2,146 (100%)	111 (100%)

Reliable and valid instruments

With respect to the fourth criterion noted above (reliable and valid instruments), a questionnaire should contain items that are pertinent to the objectives. "Valid data come from surveys that measure what they purport to measure" (Fink, 1995, p. 5). The three questionnaires under consideration here were all reviewed by colleagues and then pilot-tested to ascertain that the questionnaire items were clearly understood by the participants.

In this respect, the general guidelines for developing survey instruments as advanced by Wiersma (2000, p. 169) are useful:

(i) except for possibly a few items that request background or demographic information, the item should relate directly to the research problem, questions, or hypotheses;

(ii) items should be clear and unambiguous;

(iii) only one concept should be included in a single item;

(iv) the use of leading questions should be avoided;

(v) only information that the respondent is able to provide should be requested; and

(vi) shorter items are to be preferred to longer items, and simpler items are to be preferred to complex items.

Appropriate analysis

With respect to the fifth criterion noted above (appropriate analysis), although surveys can use a variety of conventional statistical procedures to analyze the data, the appropriate analysis depends on the survey aims (such as description, comparison, and correlation) and the size of the sample.

In comparing education and business faculty members in the first questionnaire, *t*-test (at an alpha level of .05) was used to determine the differences for all factors between the two groups in assessing facilitators and inhibitors in the use of CAI. Similarly, in the second questionnaire, *t*-test was used (again with an alpha level of .05) in making the comparison between Chamorro and non-Chamorro women. The reliability coefficient alpha across all the 29 aspiration items was .8677. In the third survey, the 18 item scores were combined into five cluster scores. Internal consistency reliability was estimated by computing alpha coefficients for the clusters. These

ranged from .28 (relationship skills) to .79 (empathy). It should be noted that a coefficient alpha of .28 is unreliable, indicating in this case that items in relationship skills were not measuring the same thing. ANOVA was used to examine the significant differences on the variables of gender, age, ethnicity, and teaching experience in each of the elements (at an alpha level of .01).

Accurate reporting of the results

With respect to the sixth criterion noted above (accurate reporting of results), Fink (1995) has noted that accurate survey reports require knowledge of how to use tables and figures to present information.

In all the three questionnaires under consideration here, both ordinal data and nominal data (that is, categorical data such as age and gender) were summarized in tables. Tables are useful and effective in most cases, although it should be noted in passing that Patten (1995, p. 90) is of the opinion : "Generally, figures are more eye-catching, and many people find them easier to interpret than tables."

Overall assessment of the surveys

Table 5 is a summary of the three questionnaires from objectives to results.

Table 5. Summary of three questionnaire studies

	Faculty computer-assisted instruction questionnaire (1995)	**Undergraduate women's aspirations questionnaire (1998)**	**Faculty multicultural education questionnaire (1999)**
Objective	To identify and prioritise the factors influencing the university faculty members' use of computer-assisted instruction (CAI) in Singapore.	To determine UOG undergraduate women's views on quality of life, identifying their educational and social status aspirations	To examine UOG faculty members' attitudes to diversity and multicultural education, with a focus on diversity, ethnicity, and pluralism.
Instrument	A 3–page questionnaire (incorporating demographic information) with faculty members being asked to indicate on a 5-point scale the importance of 33 factors (15 facilitators; 18 inhibitors) in the use of CAI.	A 6-page questionnaire (incorporating demographic information) with women being asked to indicate on a 5-point scale the importance of 29 aspiration items, 15 gender equality items, and 8 self-evaluation items.	A 3-page questionnaire (incorporating demographic information) with faculty members being asked to indicate on a 5-point scale the importance of 18 diversity and multiculturalism questions.

Sample	Participants were drawn from two groups (business and education). A survey was sent by campus mail to 118 faculty members and the usable response rate was 53% (N = 63).	The study population was the entire undergraduate women at UOG. A survey was mailed to randomly selected 350 women: the usable response rate was 32% (N = 111).	The study population was the entire full-time faculty at UOG. A survey was sent to all faculty members by campus mail: the usable response rate was 51% (N = 104).
Data analysis	In prioritizing items, overall mean scores and standard deviations for all respondents by all items were calculated, and *t*-test was used to determine the differences between these two groups.	In prioritizing items, overall mean scores and standard deviations for all respondents by all items were calculated, and *t*-test was used to determine the differences between Chamorro and non-Chamorro women.	ANOVA was used to examine if the obtained sample and potential sample differed significantly on the variables of gender, age, ethnicity, and teaching experience in each of the elements.
Results	Major facilitators were "teachers' knowledge and skills in technology" and "availability of hardware/software", whereas "lack of teachers' time" and "lack of technical support" were the most important inhibitors for the use of CAI.	Respondents indicated their strong desires to achieve self-satisfaction through pursuing occupational careers and earning their own incomes. There were no significant differences between the two groups (Chamorro and non-Chamorro) in aspirations.	71% of respondents agreed with pluralism applied to education. Regardless of gender, age, ethnic background, or teaching experience, the respondents rated diversity and multiculturalism highly.

Improving reliability and validity in questionnaire research

Why do people use questionnaires? Questionnaires are a practical method for obtaining many types of information from people and, in many circumstances, the most economical method. A common misconception is that it is easy to design and conduct a survey questionnaire. However, as Litwin (1995, p. 1) has noted: " ... there are good surveys and bad ones ... good surveys yield critical information and provide important windows into the heart of the topic of interest." To improve future studies, it is necessary to discuss the major limitations shown by the above three examples of questionnaire research.

The first limitation to be considered in assessing the three survey instruments discussed in the present paper is the question of their reliability, validity, and practicality. Although the instruments were revised as a result of expert opinion, and although they were pilot tested, they might still not have been as valid (accurate) and as reliable (consistent) as standardized or published instruments. To achieve reliability, test-retest reliability should be applied (that is,

having the same respondents complete a survey at two different points in time). Or alternate-form reliability should be performed (that is, using differently worded items or changing the order of items to measure the same attribute). These tests are useful, even though, in practice, their usefulness can be limited by the fact that people might "become familiar with the items and simply answer based on their memory of what they answered the last time" (Litwin, 1995, p. 13). Expert opinion can be used to ensure that questionnaires adequately cover the relevant topics, and to judge how well the instrument meets the standard.

The second limitation to be considered is the exploratory nature of these studies. In the first two questionnaires, single-item comparisons were made, rather than multiple item measures. Questionnaires containing single items are easier to develop and quicker to administer. However, as Litwin, 1995, p. 21) has observed: " ... the data set is richer and more reliable if several different items are used to gain information about a particular behavior or topic" (Litwin, 1995, p. 21). The third questionnaire used multiple items, which was more reliable when analyzing data in relation to the specific objectives of the research.

The third limitation to be considered is the Likert-scale method. A 7-point or 9-point scale might have yielded more accurate results than the 5-point scale used in Tables 1 to 3, because the mean scores suggested there was no clear distinction between the importance of each item.

Finally, Wiersma (2000) has noted that a covering letter is an essential part of any questionnaire. A covering letter introduces individuals to the purpose and nature of the questionnaire and motivates a response. Figure 1 depicts the covering letter used with the faculty multicultural education questionnaire. In regard to recipients completing the questionnaire in an accurate and timely manner, Wiersma's (2000) following observations are useful: "... the purpose of the questionnaire is clearly stated, confidentiality is assured, a deadline is given for the return of the questionnaire, and appreciation for completing the questionnaire is expressed" (p. 173). Indeed, without respondents, questionnaire analysis is impossible and the cover letter is the passage to the successful questionnaire research.

Figure 1. Cover letter used with the faculty multicultural education questionnaire

Dear UOG Faculty:

The University of Guam and the region of Micronesia lie between East and West, and one of the paramount goals of this institution is to provide undergraduate and graduate programs that are not only international in context but also build upon this region's unique and varied cultural experiences.

We respectfully ask you to take a few minutes out of your busy schedules to complete the attached survey concerned with diversity and multiculturalism. By answering this survey questionnaire, you are supporting faculty research and contributing to the pursuit of knowledge. Our research findings will be summarized and communicated back to you. All efforts have been taken to maintain confidentiality and we assure all participants that the data will be presented only in summary form and that the individual surveys themselves will be kept secure by us.

Please complete and return the survey by November 12, 1999, to ensure that your comments are included in our survey. Please drop it in the interoffice mail. Again, thank you for your participation.

Sincerely,

Yukiko Inoue
College of Education

Kirk Johnson
College of Arts and Sciences

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Note: "Faculty multicultural education questionnaire" was a collaborative work with Kirk Johnson, an associate professor of Sociology, at the University of Guam.

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