Reliability and Factorial Validity of the Attitudes Toward Computer Usage Scale in Saudi Arabia

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ABSTRACT. The use of Computers in Saudi Arabia is growing rapidly. Thousands of computers are being installed in various schools around the country. Yet there is no reliable way of measuring changing attitudes towards computer use. Therefore, this study was undertaken to determine the usefulness of the Attitudes Toward Computer Usage Scale (ATCUS) in Saudi Arabia, its factorial validity and reliability were examined. The sample consisted of 210 undergraduates students from King Saud University. Results indicated that the (ATCUS) is a convenient, reliable and valid measure of computer attitudes in Saudi Arabia and it can be confidently and effectively employed in research and program evaluation contexts.

Microcomputers are becoming a part of daily life. Computer use in Saudi Arabia has increased dramatically in the past few years. In recent years microcomputers have become less expensive, easier to operate and more compact. With the expansion of the role computers play in daily life, it has become necessary for universities and schools to create opportunities for students to learn about and work with computers. The success of computer instruction or computer projects may depend upon the attitude toward computers of their users, and of teachers and students (Lawton and Gerscher 1982). As a result from a new secondary school curriculum which was introduced in 1975, 100 out of 369 Government Secondary Schools now feature computer studies among their core courses. More than 1600 microcomputers are now available in these schools and about the same number in

private schools in Saudi Arabia. Computer studies take up 7.48% of the annual program in this newly developed secondary school curriculum (See Fig. 1).

It is expected that the new curriculum will have its impact, and increase familiarity with computers and related technology, among new high school graduates. Consequently, this will gradually change the attitudes of the future university students.

It is suggested that a longitudal study of attitudes towards computer, using a scale of proven reliability and validity, would be especially valuable at such a significant moment in the country's educational history.

To examine the factorial validity and reliability of the Arabic Version of Attitude Toward Computer Usage Scale ATCUS, Popovich *et al.* (1987), a validation study was conducted in Saudi Arabia.

Method

Popovich *et al.* (1987), developed a five point Likert scale from "strongly disagree" to "strongly agree". To date there is no instrument available to measure attitudes towards computer usage in Saudi Arabia using native language. Nevertheless ATCUS proved to be a suitable choice for measuring attitudes towards computers in the United States of America. The ATCUS revealed validity and reliability and it consists of a reasonable number of items. A sample of undergraduates from the United States was used (Popovich *et al.* 1987). The factor analysis of the scale revealed four interpretable factors:

- Negative reactions to computers (seven items).
- Positive reactions to computers (five items).
- Computer and children/education (five items).
- Reactions to (familiar) computer-related mechanisms (three items) (Popovich) *et al.* 197, p. 266).

The original scale is designed to assess attitudes toward computer and computer-related technological devices. It consists of 20 items.

The ATCUS (Popovich, *et al.* 1987) was translated into Arabic following the steps suggested by Brislin (1980). In order to examine the validity and reliability of the Arabic version of the ATCUS, a sample of 210 undergraduate subjects from King Saud University in Saudi Arabia were asked to complete the scale. Their mean age was 22.0; S.D = 2.3.
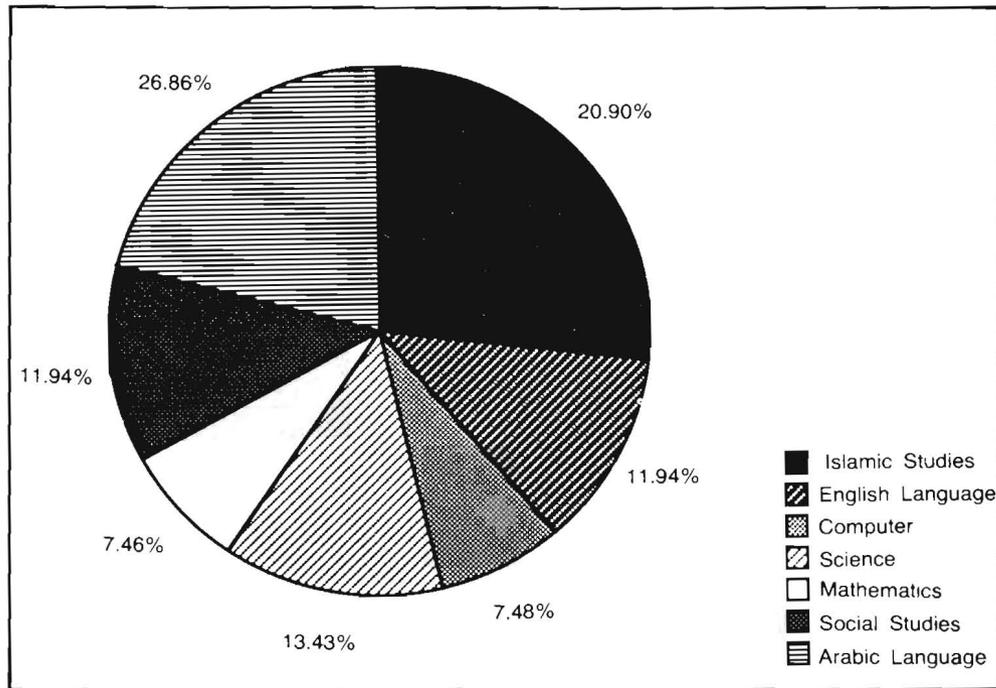
Fig. 1. Distribution of the course contents in the general phase of the new high school curriculum (Al-Faleh 1989, p. 72)

Resutls

The data was analysed in the same way as Popovich, *et al.* (1987). The analysis used was a principle factor analysis (PC) followed by varimax rotation of factors with eigenvalues greater than one. Three factors, accounting for 59.2% of the variance, emerged. The loadings obtained from this analysis are shown in Table 1. The loadings are ordered according to their magnitude of loading on the three factors.

Means, standard deviations of the items on each factor, and internal consistency (alpha coefficients) were also calculated for each of the three factors and for the total scale. Intercorrelations among the three scales and total scale were also computed. See Table 2 and Table 3.

Discussion

The reliability of the Arabic Version of ATCUS and the factor analysis results suggest that the scale appears to be of use in a Saudi Arabian context. The reliability was high and the factorial validity was satisfactory. The structure which was obtained does reflect the nature of attitudes that the person may hold. Social psychologists have defined attitudes as relatively stable orientations toward some aspects of the things around the person and have defined three components. These

Table 1. Factor loadings for the 20-Item ATCUS among Saudi Arabia Subjects

Item Number	Factor I	Factor II	Factor III
19	.93		
16	.90		
12	.90		
17	.89		
20	.87		
13	.85		
18	.85		
19	.83		
17	.83		
11		.67	
6		.67	
10		.64	
1		.63	
3		.63	.42
8		.56	
9		.55	
4			.71
5			.60
2			.59
7			.57

components, applied to the measurement of attitudes toward computer and related objects, include the following:

- A cognitive component, which is the belief that a person holds about computers.
- An affective component, which indicates a person's inward feelings toward computers.
- A behaviour component, which reflects the person's actions in relation to computers.

The factors obtained from this study indicate that these items may be used to measure the three components of attitudes toward computers and related devices. The reason for the differences in the factor structures which was obtained in this study and those reported by Popovich *et al.* (1987) may be due to cultural differences between the United States and Saudi Arabia. The results reflect that the subjects did not experience computer usage at an early age as did their American counterparts. This reflects the reason behind finding three factors only instead of four factors in the original study, since the missing factor deals with the

Table 2. Alpha reliability for (ATCUS) total score, factor I, factor II and factor III

Scales	Alpha
Total	.88
Factor I	.96
Factor II	.79
Factor III	.65

Table 3. Means, standard deviations, and correlations between the three factors and the total score

Scales	Mean	S.D.	F I	F II	F III	Total
Factor I	59.4	20.7	.00	.15**	.00	.91***
Factor II	31.2	17.7	.15**	.00	.42***	.53***
Factor III	14.9	6.7	.00	.42***	.00	.32***
Total	22.0	2.3	.91***	.53***	.32***	.00

** <.01
*** <.001

children's education. The results obtained in this study support the use of ATCUS in countries other than the United States. Since computer technology is dramatically increasing in business and educational organizations, an application of this view to these settings would seem important. Thus, studying the effects of computers on students and employees, and the attitudes that students and employees hold toward computers appears warranted. Myers (1983) indicated that if an attitudinal instrument attempts to predict behaviors, then the attitudes obtained must be specifically related to behavior. One application of the ATCUS to computer organizations could be used with introductory computer students. Another area of application of the ATCUS deals with determining current employees' attitudes about computers before interfacing occurs. Therefore, the results of this study suggest that the ATCUS is a reliable and a valid measure of computer attitudes and that it can be used confidently and effectively in research and program evaluation contexts. In conclusion, these findings offer broad support for the use of the ATCUS as a research measure of attitudes toward computer and related technology in Saudi Arabia.

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دراسة الدقة والنيات لمقياس «اتجاهات استخدام الحاسوب في المملكة العربية السعودية باستخدام تحليل الصدق العاملي للعناصر»

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ينطلق هذا البحث من الأهمية المعطاة لتطبيقات الحاسوب في البيئة السعودية في الآونة الأخيرة، ويهدف إلى إيجاد مقياس مقنن للبيئة السعودية، يقيس درجـة التغيـر في إتجاهـات المستخدمـين بين الـوقت والآخر. ويكـون مناخـاً للباحثين، وحيث أنه يتوفر مقياس لـلإتجاهـات نحو استخـدام الحـاسوب (ATCUS) في البيئة الأمريكية لذا فقد رأى الباحثـان دراسة درجـة الثبات ودرجـة الصدق لهـذا المقياس في البيئة السعودية، فقاما بتعريبه أولاً ومن ثم عرضاه على فريق خـبراء في البحث العلمي بجـامعة الملك سعـود، وأُجريت التعـديلات حسب ملاحظاتـهم وبعد تنقيح وطباعة هذا المقياس نُفِّذت الدراسة عملياً حيث اختيرت عينة فرضية مكونة من (٢١٠) طالب من طلبة جامعة الملك سعود من مختلف التخصصات .

ويتكـون هـذا المقياس من عشرين سؤالاً لمعرفة الإتجـاه نحـو الحـواسيب والتقانات ذات العلاقة بالحواسيب.

وتم تحليل بيانات الدراسة الأصلية باستخدام التحليل العاملي حيث اتضح تراكم عناصر القياس في ثلاث مجموعات رئيسية من العوامل، درجة الثبات لكل عامل على النحو التالي :

العامل الأول   :   ٠,٩٦

العامل الثاني   :   ٠,٧٩

العامل الثالث   :   ٠,٦٥

وجميع هذه النتائج تعتبر دالة احصائية دقيقة واستنتج الباحثان أنه يمكن تطبيق هذا المقياس للبنين في البيئة السعودية .

وأمكن تصنيف العوامل الثلاثة المذكورة أعلاه على النحو التالي :

العامل الأول   :   الأسئلة التي تعني بالجانب المعرفي .

العامل الثاني   :   الأسئلة التي تعني بالجانب العاطفي .

العامل الثالث   :   الأسئلة التي تعني بالتصرفات الصادرة من الإنسان بسبب علاقته بالحاسوب (ردود فعل) .

ويلاحظ أنه في البيئة الأمريكية وُجد عامل رابع وهو الحاسوب والأطفال. . ولم يظهر هذا العامل كدالة احصائية في البيئة السعودية وعزا الباحثان هذا الجانب إلى أن تطبيقات الحاسوب للأطفال لم تتسع بعد بالقدر الذي يترك أثراً واضحاً في حياتهم المستقبلية .