

Distance guidance for lifelong learners in Hong Kong: development of an online programme preference assessment instrument

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In order to build a knowledge-based society and meet the needs of lifelong education, open learning opportunities are growing at exponential rates. While such growth is commendable, there appears to be a very strong demand for distance guidance services in open education programme selection. The purpose of this study was to develop the online self-directed inventory, the Academic Programme Preference Instrument (APPI), for the lifelong learners in Hong Kong. The methods of questionnaire survey and standardized psychological measurement were employed. In this study, 2775 respondents were surveyed in order to identify and verify the inventory, using a multistage stratified cluster sampling technique. The inventory consists of 112 items under nine personal attribute types, namely: organizational; mechanical; scientific; sociological; mathematical; literary; musical; aesthetic; and social service. Eighty-nine distance and continuing education professionals were invited to help to determine the most important personal attributes that a learner should possess in order to meet the minimum entry requirements of each of the 73 education programme categories that account for over 800 open education programmes in Hong Kong. The online APPI, in English and Chinese versions, has been linked to the homepage of the Hok Yau Club in Hong Kong for the public to use freely. As Hong Kong aims to foster lifelong learning in a knowledge-based society, it is expected that the APPI can help lifelong learners to make wise open education programme selection and to enhance learners' success in pursuing continuing education.

Introduction

Open learning has been becoming an important part of the mainstream of educational systems worldwide as they aim to build a knowledge-based society and meet the needs of lifelong education (Council of the European Union 2004; IAEVG

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2004). These goals require a paradigm shift in career guidance. Services need to be available at times and in forms which will encourage all citizens to continue to develop their skills and competencies throughout their lives (IAEVG 2004). While open learning provides a flexible quality education and makes education for all and education for individuals possible, distance career guidance needs to be provided to assist people of any age and at any point throughout their lives to make wise educational training and occupational choices.

The increasing pace of economic change, in technologies, in product and labour markets, and the presumed increase in the rate of depreciation of knowledge and skills have forced the move towards lifelong learning, which emphasizes that learning occurs throughout the course of an individual's life. The characteristics of a lifelong learning society include 'the centrality of the learner, catering to diverse learners' needs, emphasis on the motivation to learn, self-paced and self-directed learning, online learning, the multiplicity of educational and training policy objectives' (ILO 2003). Therefore, open learning is increasingly becoming an essential model of learning for lifelong learners and there has been a rapid increase in the number of open learning programmes. For example, in Hong Kong, there were 542 open academic programmes in September 2002 (Zhang *et al.* 2004), but this rose to over 800 by the end of 2004. With the increasing number of open learning programmes, it is urgent work for educators to provide effective distance guidance services as a part of educational programme selection. However, no tools of psychological assessment have been developed exclusively to enable lifelong learners to make open education programme choices in the Hong Kong context. From the literature reviewed, although there have been several psychological tests for adult learners in Western countries, none of them was suitable for implanting in Hong Kong because of the differences in economic structure, cultural background, educational system, and especially job market and linguistic characteristics (Yang 1990; Zhang 1998; Zhang and Au Yeung 2003).

This article reports the results of the online self-directed psychological test for lifelong learners, which can match personal attributes and relevant open education programmes in Hong Kong. The test intends to act as an effective and user-friendly instrument for lifelong learners to select open education programmes. It is expected that this comprehensive testing instrument can also become an important component of student support services in continuing higher education institutions in Hong Kong.

Framework of the study

The framework for the development of academic programme selection, designed by the first author of this article, was used in this study (Zhang and Au Yeung 2003) and includes five steps: (1) developing an online open education programme preference inventory that is culture-specific; (2) setting up a database on open education programme requirements; (3) designing a computing programme to match personal types of psychological characteristics with open education programme desirability; (4) learners having access to the results of their attribute types and related suitable open education programmes for reference; and (5) establishing a database of measurement in English and Chinese versions for further validation and updating normative data.

Methodology

Method

The methods of questionnaire survey and standardized psychological measurement were employed.

Sample

The data of samples in the surveys are summarized in table 1.

Aiken (1997) reported that interests of children and young teenagers are relatively unstable until the ages of 15–17, when their preferences for varying types of activities are generally established. In this study, the students from Forms 4 to 7, ranging in age from 15–19, formed the samples for the main and verification surveys.

Procedures

The development of the APPI included the following nine stages.

Stage 1. Design of a draft inventory The 14-dimension 454-item inventory in three parts of interests, skills and qualities, related to social, school, family and leisure activities, and the adjectival phrases and words for describing peoples' personality types in the Hong Kong context, was developed and reviewed by the project team.

Stage 2. The first survey (validation of the inventory) Seven career masters in Hong Kong and 20 international psychologists and career counsellors from the UK, the USA, Taiwan and Mainland China accepted invitations and validated the methods, structure and content of the inventory. Based on their feedback from validators, the draft inventory was revised and 34 items were deleted.

Stage 3. The second survey (pilot study) The order of the remaining 420 items was randomized. A pilot study was carried out on 49 Form 4 to Form 7 students. Minor changes in language were made.

Stage 4. The third survey (test-retest) A test-retest for reliability analysis was carried out with 194 students, using the 420-item instrument. The interval time of two tests with the same students was three weeks. The reliability coefficient was 0.69. 102 items

Table 1. Samples for development of the APPI

<i>Survey</i>	<i>Purpose</i>	<i>N (Male)</i>	<i>N (Female)</i>	<i>N (Total)</i>
First survey	Validity test	16	11	27
Second survey	Suitability test	30	19	49
Third survey	Reliability test	107	87	194
Fourth survey	Main study	635	653	1288
Final survey	Verification study	558	686	1244

with item-total correlations less than 0.4 were discarded and the coefficient of the remaining 318-item inventory rose to 0.72.

Stage 5. The fourth survey (identification of personal attribute types) One thousand, two hundred and eighty-eight data sets were received and a factor analysis of the data revealed nine interpretable factors. There was a further reduction of 190 items from this scale, based on their factor loadings and item-scale reliability. The resulting 128-item scale had an alpha reliability of 0.98.

Stage 6. The final survey (verification of the multidimensionality of the inventory) Data were collected from 1244 subjects and the multidimensionality of the scale was examined by factor analysis. Comparable to the findings in the main study, nine types of attributes remained the same as for the results of the main study. One hundred and twelve items were yielded in nine attributes, with an alpha reliability of 0.955. Gender-based norms for each attribute were also established.

Stage 7. Collection and classification of open education programmes From websites of all continuing educational institutes in Hong Kong, approximately 800 open education programmes were found and analysed, falling into 73 programme categories.

Stage 8. Determining minimum desirability ratings Eight-nine programme leaders/programme coordinators/course coordinators/lecturers determined the most important personal attributes that a potential student should possess in order to meet the minimum entry requirements of each of the 73 education programme categories, based on the nine attribute types identified.

Stage 9. Establishment of the online APPI The nine-attribute, 112-item inventory was named the APPI – an online, self-directed standardized test of the measurement of educational programme preferences for learners, based on all open education programmes in Hong Kong. This is linked to the homepage of the local Student Guidance Center (Hok Yau Club).

Results

Following the framework of five steps in this study, the results are reported on the five parts accordingly.

Part 1. Establishment of APPI with a culture-specific context

The outcomes of data analysis based on 1244 data sets from the final survey on verification of the multidimensionality of the inventory are reported below.

Types of the personal attributes According to an exploratory factor analysis (principal component analysis with varimax rotation) of the data, nine interpretable factors were confirmed, which means the results were the same as for the main study (for details please refer to Zhang *et al* 2004). All 112 items were found to load significantly ($> .40$) on the nine factors. Based on the item content of each factor, nine adjectives were deemed most suitable to describe the personal attributes: organizational;

Table 2. Description of the nine personal attributes

Organizational: this individual's persuasive and charismatic qualities usually situate him or her in a leadership role with others. This is also reflected in their ability to make sound decisions in a timely manner, thus indicative of an individual who is intuitive and highly independent.

Mechanical: this individual can be characterized by his or her ability to manipulate machinery, electronics and computers. This refers to operating, installing, repairing or troubleshooting various devices. In addition, such an individual is skilled at designing applications for computers or mechanical objects.

Scientific: this individual enjoys all science disciplines, including biology, physiology and chemistry courses. Beyond the classroom, this individual will also interact with the environment, examining the constituents of food, medicine, plants and microscopic organisms, and also has an interest in conducting various science experiments.

Sociological: this individual is well read in various areas that directly or indirectly affect society, such as law, politics and economics. Such an individual is also inclined to actively participate in political activities or interact with others to discuss politics or gather individuals' perceptions on social issues.

Mathematical: this individual is skilled at manipulating numbers. Some examples include solving mathematical and practical problems, understanding and analysing numerical data and measuring objects. This individual is also interested in studying arithmetic courses.

Literary: this individual expresses interest and skill in reading and writing in the areas of literature and language. Interests include memorizing literary passages, writing short stories and learning new vocabulary. This individual expresses him-/herself well in writing and is also skilled at proofreading, grammar and analysing literature.

Social service: this individual enjoys working for the community. Specifically, this person engages in activities to help individuals in need (senior citizens, the mentally challenged, depressed, the sick), volunteering for charity organizations and protecting the environment.

Musical: this individual is musically inclined in all areas of the discipline. For example, this individual is interested in reading music theory and biographies of musicians, composing or writing songs, playing a musical instrument or singing on stage. This individual is also skilled at teaching others to sing or play an instrument and conducting a band.

Aesthetic: this individual is skilled at drawing, photography and especially design. Skills in design include advertisements, interior design and stage props. This individual is interested in visiting galleries and photo exhibitions.

Source: Zhang, Wang and Ng, 2004

mechanical; scientific; sociological; mathematical; literary; social service; musical; and aesthetic.

Reliability Internal consistencies of the APPI and its subscale were examined by reliability analyses. Cronbach's alpha reliability and split-half reliability tests were conducted. The internal consistency of the total score of the APPI was 0.95 and the subscale internal consistency coefficients ranged from 0.88 to 0.94, based on Cronbach's alpha reliability test. The split-half correlation of the APPI scale was 0.83 and the subscales split-half correlations ranged from 0.84 to 0.92.

Validity The methods, structure and content in the APPI subscales were evaluated by 20 international psychologists and career counsellors from the UK, the USA, Taiwan and Mainland China.

Suitability The items of the APPI were constructed specifically for the Hong Kong context. The suitability of the items was assessed by the President of Hok Yau Club

Table 3. Norms of APPI based on gender

<i>Factor</i>	<i>Male (N = 558)</i>		<i>Female (N = 686)</i>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Organizational	3.26	.58	3.21	.59
Mechanical	3.32	.80	3.44	.69
Scientific	3.19	.74	2.90	.75
Sociological	2.73	.70	2.54	.62
Mathematical	2.99	.76	2.57	.73
Literary	2.73	.66	2.93	.70
Social service	3.15	.62	3.46	.60
Musical	2.76	.82	2.96	.82
Aesthetic	3.16	.73	3.42	.68

in Hong Kong and seven career masters in Hong Kong. In addition, the survey instrument was pilot-tested.

Standardization Based on 1244 data sets, the norms of APPI were established in table 3.

Subscale inter-correlations of the APPI Subscale scores were calculated by averaging scores on the items that loaded onto the relevant factor. To check whether the subscales measure different traits, Pearson correlation coefficients between the subscales were examined. The correlation coefficients ranged from 0.06 to 0.54. There was no indication of multi-collinearity. The correlation matrix between subscales is shown in table 4.

Part 2. A database on open education programme requirements

A review was conducted recently, which found that there were more than 800 open education programmes offered by continuing educational institutions in Hong Kong. Due to the increasing number of open educational programmes, the list of academic programme categories edited by the University Grants Committee in 2003–2004 was reviewed.

As a result, the 73 academic programme categories under seven areas were classified as shown in table 5.

Eighty-nine selected programme leaders/programme coordinators/course coordinators/lecturers from different disciplines of the continuing education institutes in Hong Kong accepted an invitation to act as consultants in this investigation. Specifically, these individuals were requested to help to determine the most important personal attributes that a potential learner should possess in order to meet the minimum entry requirements for each of the 73 academic programme categories, based on the nine psychological types identified.

To minimize bias, each educational programme category was assessed by at least three programme leaders/programme coordinators/course coordinators/lecturers on a nine-point scale (from most important to least important), which

Table 4. Subscale inter-correlations of the APPI

	<i>Organizational</i>	<i>Mechanical</i>	<i>Scientific</i>	<i>Sociological</i>	<i>Mathematical</i>	<i>Literary</i>	<i>Musical</i>	<i>Aesthetic</i>
<i>Mechanical</i>	.27							
<i>Scientific</i>	.30	.41						
<i>Sociological</i>	.37	.17	.17					
<i>Mathematical</i>	.32	.50	.43	.29				
<i>Literary</i>	.41	-.21	.09	.38	.09			
<i>Musical</i>	.35	.17	.15	.12	.13	.31		
<i>Aesthetic</i>	.45	.23	.20	.13	.10	.31	.42	
<i>Social service</i>	.54	.06	.27	.29	.17	.38	.32	.42

Table 5. Educational programme categories in Hong Kong

<i>Areas</i>	<i>Categories</i>
Medicine, dentistry and health	Medicine Nursing Pharmacy Optometry Biological sciences Botany Environmental studies
Sciences	Chinese medicine Dental technology Medical technology Food sciences Chemistry Mathematics, statistics and actuarial science Civil engineering
Engineering and technology	Chemical engineering and materials techniques Electrical engineering Biotechnology Mechanical engineering Architecture Business administration Finance and investment Institutional administration
Business and management	Electronic engineering Textile and clothing technology Transport and communications Town planning Management studies Banking Commercial studies Studies of regional cultural Psychology Public administration Law enforcement and security Library science
Social sciences	Accountancy Marketing Logistics Sociology Social work and counselling Law Criminology
Arts and humanities	Comparative literature Foreign language and their literature Philosophy Drawing, painting and sculpturing Arts Physical education
Education	Dentistry Rehabilitation medicine Medical diagnostic treatment Physiology Physics Computer science and information technology Surveying Computer engineering Manufacturing and industrial engineering Building and real estate Chinese language and literature Linguistics Religion and theology Music Recreation and sports

was later normalized to a standard five-point scale. Higher scores signified greater importance.

Part 3. Designing a programme to match personal attribute types with open education programme desirability

A programme was established to match personal attribute types with open education programme desirability. The online APPI was developed using the Java programming language and hosted on a UNIX (Solaris) platform.

Part 4. Online APPI for the public to use

Table 6. Four components of online APPI

Introduction

Welcome to the Academic Programme Preference Inventory (APPI)!

This instrument will help in assessing your personal attributes and suggest matches for you to a list of academic programme categories. Specifically, the APPI will provide you with a list of the academic programme categories that are suitable for you based on your personal interests, skills and qualities. Keep in mind that the APPI is strictly an electronic guide to offer suggestions towards a pathway in continuing education rather than making selections for you. When considering your final choice of study programme, please be aware that it is also influenced by other factors such as educational qualifications, work experience, language ability and personal values. Like other psychological tests, the assessment results are only for your reference, and you still have to make your final decision.

Note: funded by the Education and Manpower Bureau, this inventory was developed by the Centre for Research in Distance & Adult Learning of the Open University of Hong Kong (OUHK) and the Hok Yau Club.

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I ACCEPT the Terms of this Copyright Notice

Academic Programme Preference Inventory (APPI) (examples)*

For each item, please select the number that best represents yourself according to your own situation. This assessment should take approximately 20 minutes to complete.

Strongly agree Agree Neutral disagree Strongly disagree

I am interested in:

Solving mathematical problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading journals or books about politics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading news about current affairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helping people to solve problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning new vocabulary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Table 6. (continued)

	<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>disagree</i>	<i>Strongly disagree</i>
<i>I am good at:</i>					
Designing props	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with experiment equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dealing with tables, graphs or figures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influencing other people's opinions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooperating with team members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*The Likert five-point scale was used in this inventory.

Results

Thank You for your submission of the APPI.

Your results have been categorized under the following nine attributes: organizational, mechanical, scientific, sociological, mathematical, literacy, social service, musical, and aesthetic. To view your results please select 'Your Assessment Result'.

Based on your scores in each of the above attributes, a list of academic programme categories has been recommended. You may view these results at 'Suggested Academic Programme Categories'.

You can select to view:

- your Assessment Result, or
- a list of Suggested Academic Programme Categories by our system.

The online APPI was designed to include four components: introduction; copyright notice; instrument; and the results, as detailed in table 6.

The APPI is accessible in English and Chinese versions by visiting the homepage of the local Student Guidance Centre (Hok Yau Club) (<http://www.student.hk/appraisal/appi/>).

Part 5. A database of measurement information for further validation and updating normative data

The data from users will be sent automatically to the APPI developers in Excel format for further validation and to update gender-based norms.

Discussion

The boom of open learning was driven by the rapid development of information and communication technology (ICT) and the mode of integrated teaching and learning has been used widely in open learning. In integrated learning environments, a student support service is more important and guidance needs to be provided from all perspectives. In this study, it was found that after launching APPI to the public in April 2005, there were over 8300 users in August 2005. This reflects the needs of distance guidance from lifelong learners.

This study employed a distance guidance framework for open education programme selection, which was developed by the first author of this paper, with five steps: development of an inventory; establishment of a database on educational programme requirements; design of an online matching programme between personal attributes and educational programme desirability; use of ICT to provide services for the public; and the automatic updating of user data for further validation. The success of the framework used in this study suggested that this general model could be a useful reference for open education institutes in other regions in the development of this kind of inventory.

The 8300 data sets from public users of APPI from April to August 2005 were received and the gender-based norms were updated. It would be valuable to conduct a further study on a comparative analysis of data received from the subjects involved in the development of APPI and users from the public for further validation.

Conclusion

This is a collaborative research project conducted by educational researchers and practitioners, which provides practical services in educational and career guidance for lifelong learners. It is expected that the outcomes of this collaborative research could be beneficial for researchers, practitioners and clients. The article reports on the final outcomes of the development of an open education programme preference inventory, using ICT, for lifelong learners in Hong Kong. The results show that lifelong learners need lifelong guidance and that the use of ICT can be an effective way for open education institutes to provide distance guidance for lifelong learners.

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