DESIGN AND DEVELOPMENT OF AN APTITUTDE TEST FOR FASHION AND TEXTILE DESIGN STUDY

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ABSTRACT:

Aptitude test is a commonly deployed tool in education assessments to evaluate candidates' potential for the intended study of a specific area of knowledge. It enables evaluating the innate abilities and qualities of individuals against specific requirements and thus helps decide if an individual is suitable for a specific pursuit. Yet, an aptitude test often finishes at the point of completing the questions/quiz at the applicant's side for the judgmental purpose of evaluating the candidates suitability for a specific undertaking, seldom has it been deployed as a developmental and learning tool for developing and enhancing respective abilities of the applicants. It is envisaged that the design and production of an interactive aptitude test will help improve the present assessment of the students' qualities and abilities toward specific academic pursuits, and in turn serves as a complementary self-learning tool for creativity development at the students' own paces and convenience.

Keywords: aptitude test, fashion and textiles, creative study

1. INTRODUCTION

Aptitude test has been one of the most commonly deployed tools in education assessments to evaluate the candidate's potential for the intended study of a specific area of knowledge. Depending on the format and content of the test, it enables evaluating the innate abilities and qualities of individuals against specific requirements and thus helps decide if an individual is suitable for a specific pursuit. Yet, an aptitude test often finishes at the point of completing the questions/quiz at the applicant's side, and in such regard for the judgmental purpose to evaluate the candidates suitability for a specific undertaking, seldom has it been deployed as a developmental and learning tool for developing and enhancing respective abilities of the applicants.

It is envisaged that the design and production of an interactive aptitude test will help improve the present assessment of the students' qualities and abilities toward specific academic pursuits, and in turn serves as a complementary self-learning tool for creativity development at the students' own paces and convenience.

1.1. APTITUDE TESTS

Today, there are various aptitude tests which are designed to assess different abilities (e.g., Pelshenke 1993; Barrett 1998; Rebecca and Sandra 2011, Osborn and Zunker c2006, Carter and Russell c2008, Maddox c2008; etc.).

1.2. CREATIVE STUDIES AT THE HONG KONG POLYTECHNIC UNIVERSITY

The School of Design and Institute of Textiles & Clothing, The Hong Kong Polytechnic University reckon an aptitude test essential in assessing the design potential of their applicants in pursuing an intensive study in art and design to becoming professional designers.

The Institute of Textiles and Clothing (ITC) has been shouldering the sole responsibility to educate university students for the fashion and textile industry. Facing the increased challenges and competitions, creativity is undoubtedly a *sine qua non* for today's university graduates to start a career in a fast and dynamic industry such as the fashion and textile industries.

Notwithstanding ITC has put increasing emphasis on raising the entry standard and quality of the candidates applying for their programmes, with the UGC-funded undergraduate programme in particular, notable by the continuous raise of the averaged P score of the successful applicants over the past couple of years. Arguable is if such continuation of emphasis on P score which stands at the top of the Faculty of Applied Science & Textiles (FAST) in the 2004/5 application exercise of the undergraduate programme, has downside implications of the creativity of the applicants. Recent reports from faculty members teaching design subjects suggested a "laziness" of minds of the design specialism students. Very often, ideas and concepts from students admitted with sound academic performance prior to design studies are but *cliché* and designs *déjà vu*.

At present, applicants applied for the UGC-funded BA(Hons) Scheme in Fashion and Textiles programme will need to sit for an interview. Those who indicate a wish to pursuit design study will be interviewed by a panel of design staff. Yet, most of the assessments are judged based on a folio of work of the applicants. This mode of assessment is often done subjectively from without based on the *prima facie* evidences rendered by the applicants. Seldom has such assessment been conducted relatively objectively from within.

2. DESIGN OF THE APTITUDE TEST

In 2005, when the Institute of Textiles and Clothing of the Hong Kong Polytechnic University was charged with the responsibility to nourish young talents for the textile and fashion industries, it designed and developed a series of tests, namely ADDI test, to identify prospective design talents from among thousands of applicants for the fashion and textile stream of its flagship undergraduate scheme. The ADDI test consists an aptitude test (A), a drawing test, (D) a design test (D) and an interview (I). Each test aims at evaluating and assessing specific abilities of the applicants, and they are conducted in the aforementioned order. It is so because the Institute reckons the aptitude for creative studies as the most important quality, followed by design and drawing skills, and not least of all are the soft qualities of the candidates such as personality, flair, charisma, articulation, fashion sense, etc. Each test helps shortlist candidates for the following ones. Those candidates who passed all the four tests and scored the high are admitted into the design stream of the undergraduate scheme. The Institute puts emphasis on quality rather than quantity in admitting its students into their design stream. For example, in 2005, ITC admitted only 20+ candidates for their fashion and textile design stream from thousands of JUAPS and Non-JUAPS applicants into their fashion and textile design stream. The remaining quota will be shared out by the other three streams, namely technology, retailing, and marketing & merchandising.

2.1. APTITUDES

The aptitude test adopted by the Institute of Textiles and Clothing of The Hong Kong Polytechnic University addresses six specific qualities out of the original seven (Barrett 1998) which are reckoned as fundamental to students pursuing creative studies. They are 1) acuteness, 2) spatial recognition, 3) physical analysis, 4) numerical deduction, 5) observation, and 6) critical dissection. Verbal penetration was removed by the fact that it is an aptitude which emphasizes more on how well a candidate reason with words instead of visuals as a means to solve problems.

2.2. NUMBER OF QUESTIONS

In deciding the numbers of question among the seven aptitudes, reference was made to a score profile that befits design (Fig. 1).

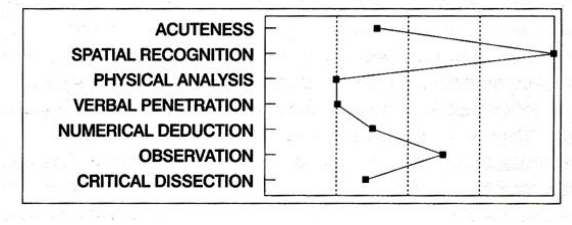


Fig. 1: The design profile of Barrett's aptitude test.

This particular design profile shows an elevated spatial recognition in order to emphasize the sense of form and symmetry required in related careers. They are usually thought of as artistic careers. Packaging design, car design and fashion and textile design would be examples.

Candidates of an aptitude for design may also score more highly on the test of observation, their visual sense assisting them there. However, they are less scientific than artistic due to their personality and motivation. If spatial recognition aptitudes are unaccompanied by pronounced aptitudes in other areas, the more likely they are to lead to strictly artistic careers or to careers related to crafts (Barrett 1998).

The numbers of question for evaluating the six aptitudes are calculated based on (multiple of) the relative distributions of the six aptitudes of the design profile ideal for creative studies or careers (Fig. 1). It is so for ease of calculation since a full score in the aptitude test will mean the most ideal for pursuing creative studies (or careers).

2.3. QUESTION EXAMPLES

Below are question examples to evaluate the six aptitudes which are considered essential for creative study pursuit.

2.3.1. ACUTENESS

In this test, the candidates have to be exact in the rules and dealing with information. It is important to work quickly in the time given, but also important not to make mistakes, as mistakes count against the scores.

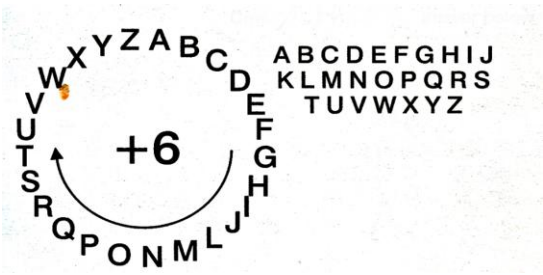
The candidates are given an alphabet containing all of the usual 26 letters

ABCDEFGHIJKLMNOPQRSTUVWXYZ

The alphabet is arranged in a circle. The letters are always in the correct order, but sometimes the letters are arranged clockwise and sometimes anti-clockwise. Inside the circle is an arrow which shows the candidates the direction of the letters. In each circle, there is always a missing letter. 'There is also a number with a plus or minus sign inside the circle. Look at the example below.

Example

Cross out the correct answer below:



First of all, candidates have to find the missing number from the alphabet. In the example, the letter K is missing. The plus sign (+) means you have to count clockwise from the missing letter. Counting 6 from the letter K gives L, M, N, O, P, Q. So, the correct answer is Q. Candidates have to cross through the letter Q in the three lines of alphabet next to the example.

Interpretation

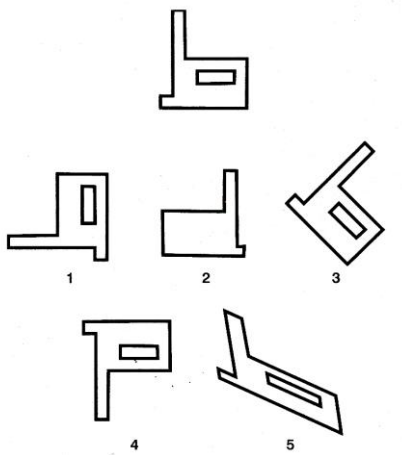
This test requires candidates to follow instructions precisely. They also have to maintain concentration in order to maintain accuracy. Alertness is essential in this task. This type of test is used to find out whether the test taker is likely to make mistakes in a task which can become boring, but is also demanding. It is the type of aptitude which is required to perform many types of work where attention to detail is essential (Barrett 1998).

2.3.2. SPATIAL RECOGNITION

This test explores how easily candidates can 'see' and turn around objects in space. They are to answer each question with a Y for Yes or possible Yes, and 'N' for No or possibly No.

The original 'b' shape is shown in the top. Below are five other shapes. Each of these is numbered. Applicants have to decide whether each of the alternatives is identical to the original shape.

Example



(Answers to example items: 1N, 2N, 3Y, 4Y, 5N)

Interpretation

This test requires candidates to hold an object in your mind, while also turning it upside down, around and pulling it out of shape. The ability to do this is associated with success in the area of design, where a sense of shape and form would obviously be required. The test of spatial recognition can also have wider implications. For example, it requires a flexibility of thinking to be able to recognise an object in a form which may or may not be the same as the original. To be able to perceive the various components of a problem in new ways is an intellectual process which is useful in electronic engineering and other 'high-tech' computer and electronic sciences. Aptitude on this test, therefore, may indicate an 'artistic' design potential, but may also indicate an engineering or technological aptitude (Barrett 1998).

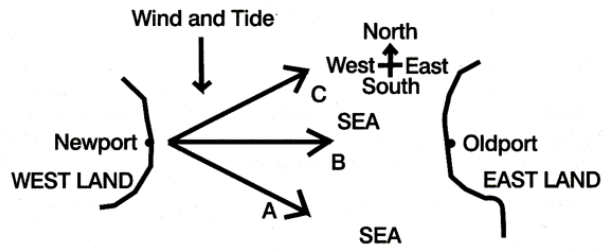
2.3.3. PHYSICAL ANALYSIS

This tests candidates' understanding of forces and dynamics. It shows their understanding of mechanical and other physical principles.

There is a written question and a diagram. Together, they contain all the information candidates require to answer the question.

Example

A sailing boat leaves Newport which is about 10 kilometers west across the sea from Oldport. Both the wind and tide are towards the south. Which direction should the boat be headed in order to have the shortest journey?



(a) A
(b) B
(c) C

The answer is 'C'. Going in direction A or B would mean that the boat would be pushed by the wind and tide towards the south, so the boat would have to turn and head north in order to arrive in Oldport. Heading in direction C counters the effect of the wind and tide, keeping the boat on the shortest route between the two ports.

Interpretation

This test demands a comprehension of what actually happens and what actually works in the real world. Although it is possible to learn the answers to these problems, people with a natural aptitude do well even though they have never seen problems like these before. It is quite a demanding test, because it also requires candidates to make sense of the verbal instructions before they start. It is analytical because there are often a number of forces operating within the problems at any one time. Candidates are literally required to 'weigh things in the balance'. Unfortunately, the fact that they can do well on this test does not always go hand in hand with the practical ability to repair or make things. It usually does, but without the necessary manual dexterity, their ability on this test will be of most use in understanding conceptual and design problems, as opposed to working upon them themselves. An aptitude to apprehend what is happening in a physical situation and make judgments about what to do is useful in areas of work connected with engineering, but also in many situations where realistic decisions have to be made, often outdoors or in situations of possible danger (Barrett 1998).

2.3.4. NUMERICAL DEDUCTION

This test how easily candidates think with numbers. They are given a series of numbers. Their task is to see how they go together to form a relationship

with each other. They then have to choose the number which would go next in the series, choosing from the four possible answers provided. It is advisable to have a piece of scrap paper and a pencil to do any working out that may be necessary. Mark the correct answer with a tick.

Examples

(1) 2 4 6 8 10 ?

(a) 11
(b) 20
(c) 12
(d) 18

Answer: (c)

Explanation: the numbers are a series. The next one in the series should be 2 more.

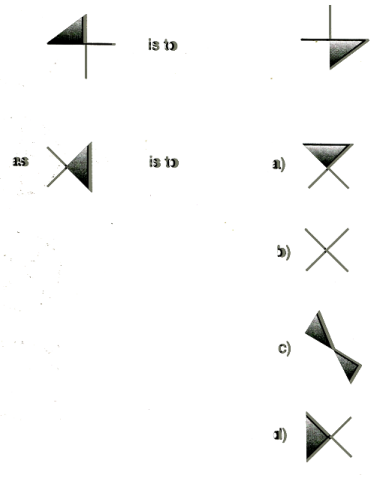
Interpretation

To perform well on this test, candidates have to perceive how numbers relate to each other. As they will have realised, it is more than a test of arithmetic. In fact, many people who think that they are 'terrible' at arithmetic often surprise themselves by doing better on this test than they expect. Each series of numbers is like a code which contains a hidden message. Candidates have to work out the relationship of the numbers with each other to deduce the answer. It is a logical exercise, without the subtleties of interpretation needed in the test of verbal penetration. The aptitude for discovering the logic in *a* series of pieces of connected information is essential in many areas of work. These are often the mathematical sciences where quantification and precise technical information exchange are required. This aptitude is found in statistically based commercial activities as well as most highly technical and research-based ones (Barrett 1998).

2.3.5. OBSERVATION

This test looks at how easily you can reason with signs and shapes.
After each question there are four possible answers. Only one is correct. Tick the answer you think is the correct one.

Example



Answer (d)

Interpretation

This is a logical reasoning test without the use of words or numbers. Candidates are required to collect information visually in order to project what would happen next in the series.

This aptitude demands that details, together with their relevance to the whole picture, are perceived clearly. It is a necessary aptitude in many sciences and in many areas where information is researched and essential details need to be abstracted (Barrett 1998).

2.3.6. CRITICAL DISSECTION

In this test candidates are asked to draw logical conclusions from the information they have been given. There is always enough information for them to come to the correct conclusion. Candidates should not draw upon any previous experience or information as this is not likely to help them.

Because of the amount of information candidates are sometimes asked to deal with, it is recommended that they have a piece of scrap paper so that they can, if you wish, draw diagrams or make notes.

Examples

Following some facts are some alternative answers. Tick the answer you think is correct.

1. Mary is heavier than Jane. Joan is heavier than Mary. Who is lightest?

(a) Joan
(b) Mary
(c) Jane

Answer: (c)

Cannot be a) because Joan is heavier than Mary. Cannot be b) because Mary is heavier than Jane.

Interpretation

This test requires careful analysis of the information given. Often candidates are required to 'fill in' missing information, which they must detect from the fragments they have been given. The items in the test are puzzles that require persistence and power of concentration.

If candidates can do this test, they will be able to succeed in many areas of work which require a sensible approach to problem solving in which they do not allow themselves to be distracted by irrelevant information, and where they do not allow themselves to become influenced by emotions. These may be situations which involve people and their problems, as well as technically specialist areas (Barrett 1998).

4. RESULTS

In the 2005 admission exercise, among the 314 JUPAS and non-JUPAS applicants who were invited for the aptitude test, the overall highest and lowest scores are 90.25 and 45.54 respectively. The average score is 75.60.

Among the six aptitudes, the highest score goes to critical dissection (97.5%) and lowest spatial recognition (14.3%). The applicants scored the highest in average in critical dissection (91.5) and the lowest in average in physical analysis (59%). Fig. 2 below summarises the highest and lowest scores (in percentage) of each of the six aptitudes in the 2005 admission exercise.

2005 ADMISSION EXERCISE	
APTITUDES:	**THE HIGHEST / LOWEST / (AVERAGE) SCORES IN PERCENTAGE AMONG 314 SUBJECTS**
ACUTENESS	96.8 / 58.6 (85.0)
SPATIAL RECOGNITION	96.8 / 14.3 (71.3)
PHYSICAL ANALYSIS	86.9/ 44.6 (59)
NUMERICAL DEDUCTION	91.1 / 39.2 (74.2)
OBSERVATION	91.1 / 41.1 (71.3)
CRITICAL DISSECTION	97.5 / 74.2 (91.5)

Fig. 2: The highest, lowest and average scores of the JUPAS and Non-JUPAS applicants in the 2005 admission exercise of BA(Hons) Fashion and Textile Design.

5. CONCLUSION

Aptitude test has been an effective means to evaluate subjects against their special qualities from within and they have been deployed for various ends. In this paper, an aptitude test which is designed to evaluate various qualities of subjects is used to evaluate and assess prospective undergraduate applicants for admission into the higher competitive BA(Hons) programme in fashion and textile design.

However simple those questions might have appeared, no applicant so far scored all right in this aptitude test since it had been deployed in 2005. There are no significant correlations between results of the aptitude test and that of any other test(s) of the ADDI test. As such, 'accumulative' total scores of the ADDI test were adopted in deciding which applicants to be admitted. Naturally, this would mean admission of high performance design students of rather difference skill sets.

Of the aptitude test *per se*, the scores of the applicants against the six aptitudes differ from one to another. This would mean that applicants who score higher in the aptitude test are excel or otherwise differently among the six aptitudes.

In particular, the highest and lowest results in average manifests that undergraduate design students in ITC are careful in their analysis of the information given and are able to 'fill in' missing information, which they

must detect from the fragments they have been given. The situations often require persistence and power of concentration. In addition, these design students are able to succeed in many areas of study that entails works which require a sensible approach (as opposed to a more creative approach) to problem solving in which they do not allow themselves to be distracted by irrelevant information and/or influenced by emotions. These may be situations which involve technically specialist areas. On the other hand, a low average in physical analysis manifests a possible failure of ITC undergraduate design students to understand what actually happens and what actually works in the real world. Although it is possible to learn the answers to these problems, people with a natural aptitude do well even though they have never seen problems like these before, i.e., extrapolation. The test is analytical because there are often a number of forces operating within the problems at any one time, of which 'weighing things in the balance' is required. The results serves as a very good reference to guide ITC in identifying their young talents and where emphasis should be place in shortlisting applicants for their BA(Hons) fashion and textile design programme in the years to come. At present, the result is suggestive enough to alert ITC if the present (over-)emphasis on high academic performance in public examination (e.g, Hong Kong Advanced Level Examination) in its admission exercise in screening prospective talents prior to the ADDI test so far is correct or otherwise.

Since the inception of this aptitude test in 2005, details of their scores were carefully and fully recorded. This record provides valuable aptitude and ability reference of individual applicants, particular those who had been admitted into the programme. Thus, emphasis of teaching and learning as well as assignments can be designed and delivered in a specific way that underpins the known deficiencies of these students in their following studies. The results also enable comparison of the abilities, creativity and/or performance among different cohorts of applicants for learning and teaching design and development purposes.

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