LEARNING PREFERENCES OF PGCE STUDENTS

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Applications for entry to Higher Education show marked differences between ethnic minority groups and marked gender preferences, particularly for mathematics. Analysing UCAS data shows that these differences are persistent. Research into learning preferences suggests that these might be one reason for these differential choices. This paper reports a study of over 417 undergraduates and 628 PGCE students, identifying clear subject differences in learning preferences. Mathematics students lie at one end of the scale and English students at the other.

When UCAS first collected data in 1990 on the ethnic origins of applicants to Higher Education it posed a variety of questions about how students made their choice of subject (Taylor, 1993; Modood, 1993; Woodrow, 1996). It is clear that students from different ethnic groups have shown differential subject choices.

	ASIAN		BLACK		WHITE		TOTALS	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Medicine/Dent.	5%	5%	1%	1%	1%	2%	2%	2%
Sub. allied med.	5%	10%	6%	10%	5%	9%	5%	9%
Biol.sciences	2%	6%	2%	4%	4%	7%	3%	7%
Maths/informatics	33%	12%	22%	8%	13%	3%	16%	4%
Eng. and tech.	10%	2%	12%	2%	10%	1%	10%	2%
Social studies	9%	16%	10%	19%	10%	13%	9%	14%
Languages	1%	3%	1%	3%	4%	8%	3%	7%
Humanities	1%	1%	1%	1%	4%	4%	3%	3%
Education	0%	3%	1%	3%	2%	7%	2%	7%
Combined sciences	4%	3%	3%	2%	2%	2%	3%	2%
Soc.st. with arts	1%	3%	2%	5%	2%	4%	2%	4%
Total Numbers	15552	14567	4312	5728	110828	129298	145177	163541

Table 1: Ethnic origin of accepted applicants, by subject group, 2000 entry

The data in Table 1 (UCAS website) has been presented in terms of the percentage of applicants/acceptances from a particular group choosing a particular subject to study. Differences between the genders are similarly clear and persistent. Three times as many women study languages as men, six times as many men study engineering. There are also interesting variations within ethnic groups and gender variations also have interesting features. Applications by Asian and Black students represented only 4% of applications for education (a proportion only larger than those for Agriculture, Physical Sciences and Humanities) whereas for Maths and Informatics they represent 32%. Nearly seven times as many Black students apply for studies including aspects of Social Studies compared to Education, areas which might both superficially be

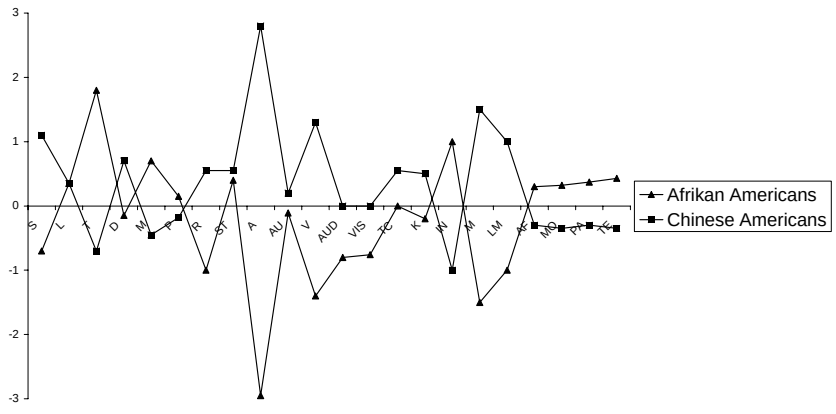
thought as related to socially involved activities. Woodrow (1996) suggests this difference might be related to the institutionalised nature of teaching and hence related to institutional racism compared to the individual support, counselling and empowerment associated with social work. Again over 22% of Asian students and 14% of Black students apply for Mathematics and Informatics compared to 7.5% of White students. This confirms a common perception that Asian students in particular are drawn to the subject. In fact the recent large increases in this subject area is almost entirely comprised of applications for computing (informatics).

2000			**1999**			**1998**
Men	Women	Total	Men	Women	Total	Total
2485	1567	4052	2402	1454	3856	3825

Table 2: Maths Recruitment

It is tempting to begin to draw speculative reasons to explain these differences, and some of these were explored in a previous article (Woodrow, 1996). The evidences are not strong, however. Clearly the cultural milieu from which the students derive will have some effects. Similarly whilst there has been a long and significant debate about gender bias in respect of mathematics, there seems little real movement, except as the proportion of students from ethnic minorities increases they perhaps do not share those biases in quite the same strengths. Woodrow (1996) suggested that learning styles have a significant influence. (By learning styles we mean preferences such as for learning alone, learning by memorising, preferring structured learning to exploratory learning, etc. rather than issues of 'cognitive style' involving dichotomies such as wholist/analyser or field (in)dependence characteristics.) Indeed, for one group relating significant to mathematics (the Chinese) Sham and Woodrow (1998, 2001) have shown that they strongly retain a very distinctive learning style to that of their White compatriots. For other groups there is little clear evidence in the U.K. relating to learning styles. In a major exploration of learning styles in the USA Dunn (1990) found that African/Caribbean students had totally reverse preferences to Chinese students in 15 out of 21 learning preferences, such as working co-operatively

Learning Preferences : Chinese Americans/Afrikan Americans
(after Dunn et al., 1990)



On subject choice and learning styles Woodrow conjectured that the way in which Mathematics is taught and learned might well select people with particular personal characteristics - authoritative, focused and convergent personalities - which might not be the most suitable for activities such as teaching (where interpersonal skills and adaptability are paramount). A small-scale survey of 38 students at the University of Lancaster reported in a DFE (1994) relating to shortages of maths and science students also conjectured that science and technology students had different learning style from arts students.

In their study of FE students, Bloomer and Hodkinson (1997) found the dispositions of students to learning were closely related to

- Their perceptions of the nature of knowledge
- Their views on the purposes of learning
- Their evaluations of the learning activity as a means of acquiring knowledge

However what the subject related learning styles are and how they relate to subject variations in recruitment is still somewhat unclear. It is this aspect of the variations that the current research project described below is designed to begin to explore.

LEARNING PREFERENCES AND SUBJECTS OF STUDY

In order to explore this a questionnaire was developed which collected biographical details, a small number of open questions (such as what do you like best about your course'), a small number of ranking questions related to learning preferences (such as 'which do you prefer: lectures, seminars, workshops, individual research') and a 50 item Likert Scale questionnaire which asked for agreement/disagreement to questions such as 'I prefer to work on my own' or 'I learn best by listening to lectures'. Returns were obtained from 417 undergraduates and 628 PGCE students (gathered at the end of two different cohorts and at the beginning of one of these cohort to enable some specific comparisons to be made).

The questionnaire was intended to explore four specific dimensions concerned with learning preferences

- Approaches to learning
- Epistemological beliefs
- Motivational factors
- Participation and interactional preferences

An overall 'learning preference score' was also calculated derived from the mean of all four dimensions. This overall score ranged between 1 and 5 with a low score indicating

- A 'deep' (as opposed to 'surface') approach to learning
- A relativistic (as opposed to 'objective') view of knowledge

- Intrinsic (as opposed to extrinsic) motivation
- Preference for a high degree of classroom interaction

It can be seen from the table that there is a general consistency amongst the students with the English and maths students operating at either end of the spectrum.

Subject	No.	Mean Score	Std.Dev.
English	88	2.43	0.33
Art	52	2.51	0.33
Physical Edn.	9	2.62	0.3
Social Sciences	14	2.63	0.26
Music	11	2.64	0.31
Science	94	2.65	0.3
Geography	32	2.65	0.42
Business Studies	33	2.66	0.42
MFL	36	2.67	0.38
Des. & Techgy.	49	2.74	0.32
Religious Edn.	16	2.83	0.33
Maths	49	2.87	0.43

Table 3: Learning Preference Scale - PGCE

Approach to Learning	Epistem -ology	Motiv- ation	Inter- action
1	1	1	1
2	3	2	3
5	9	3	4
7	2	7	6
3=	7	5	10
3=	6	10	5
9	4	6	8
8	5	12	2
10=	8	4	7
10=	10=	8=	9
5	12	11	12
12	10=	8=	11

Table 4: Rank orders in the four dimensions

The comparative undergraduate figures are given below. The PGCE students are on the whole at the 'deep' learning etc end of the spectrum - the 'English' end of the PGCE rankings compared to the undergraduate scale. It would therefore be expected that in subjects for which students have - a surface approach, a fixed knowledge, extrinsic motivation and non-interactive learning style - then recruitment to teaching might prove more difficult (i.e. maths, RE, D&T,MFL).

There is no indication, of course, as to whether the study of a particular subject 'creates' a learning preference or whether a learning preference (e.g. for the Chinese) might determine the choice of subject.

	No	**mean score**	**std.dev**
English	75	2.76	0.36
Business Studies	75	2.84	0.15
Art	47	2.85	0.11
Science	89	2.87	0.29
Maths	98	3.02	0.26

Table 4 - Learning Preference Scale Undergraduate

The data was also subject to Item Analysis and to both Oblique and Orthogonal Factor Analysis. The outcomes were consistent, but with five factors being identified: Interaction/Participation, Approach to Learning, Instructional Preferences, Epistemological Beliefs and Self-regulation. The general pattern of subject ordering remained consistent with the face validity outcomes described earlier.

PGCE students were also asked a number of course related questions from which some interesting comparative data emerged. 47% of maths students chose the PGCE because they wanted a challenging/ stable/ rewarding career (c.f. the lowest 22% for PE, and highest 54% for Art). Love of their subject motivated 18% of maths (25% of RE and 9% of music). Love of children motivated 10% of maths (0% of RE and 22% of PE and Geography). 9% of maths always wanted to teach (23% English and 0% Business studies). Previous experience teaching attracted 6% maths (36% music and 3% Business studies). 16% maths sought a career change (the highest with PE at 0% the lowest).

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