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A Comparison of Preferred Learning Styles, Approaches and Methods between Information Science and Computing Science Undergraduates

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Abstract

In recent years the two disciplines of Information and Library Studies and Computing Science have drawn closer together to the extent that now there are several Universities where they are combined in a single school of Information and Computing Science or Informatics. Currently, a single Higher Education Academy Subject Centre serves the two disciplines. However, there are marked differences between the disciplines observable immediately in the gender balance of their respective undergraduate cohorts with Computer Science tending to attract males and Information Science, females. This project set out to investigate other less obvious differences by means of an online survey of first year undergraduates' preferred learning styles, approaches to study and learning environments.

134 first year undergraduates from 6 UK Universities took part in the online survey and results showed that, whilst there was a clear gender imbalance between Computing Science with its almost entirely male population and Information Science with its mostly female population, differences in learning styles and approaches were less clear. There was a wide variety of individual learning styles and approaches in the sample population and it would not be safe to conclude that any one approach would meet the needs of an entire cohort of Information or Computer Scientists as, whenever an overall tendency appeared, there was always a small but significant group who had an opposite preference. Differences in preferred learning methods were clearer. More than twice as many Information Scientists than Computer Scientists preferred talking and discussing as a method of learning whereas Computer Scientists were significantly more likely than Information Scientists ($p<.05$) to prefer solving problems. Neither group enjoyed reading from journals or lectures. Two key teaching points for lecturers to note arose in the study; the use of advance organisers in teaching both on and offline and the need to prepare students for and support them in the use of journals.

1. Introduction

In recent years the two disciplines of Information and Library Studies and Computing Science have drawn closer together to the extent that now there are several Universities where they are combined in a single school of Information and Computing Science or Informatics. Currently, a single Higher Education Academy Subject Centre serves the two disciplines.

However, there are marked differences between the disciplines observable immediately in the gender balance of their respective undergraduate cohorts with Computer Science tending to attract males (Margolis and Fisher, 2003) and Information Science, females. This project set out to investigate other less obvious differences (which may well be related to the gender imbalances) by means of a survey of first year undergraduates' preferred learning styles, approaches to study and learning environments. For instance Severiens and Ten Dam (1997) found in a survey of over 400 students in adult education (mostly aged 16-22) that women more often use a reproduction directed learning style containing stepwise processes and associated with Biggs et al's (2001) surface approach and men are more often undirected, a style that is characterised by ambivalence and a preference for stimulating education.

The aims of the study were twofold. Firstly, to compare the preferred learning styles, approaches and environments of students opting to study Information Science and Management to those of students opting to study Computing and, secondly, to inform departments of Information and Computing Science of the preferred learning styles, approaches to study and learning environments of their new undergraduates in order that they may take this information into account when planning tuition.

Three tested approaches to assessing individual learning were selected from the variety of inventories of learning styles now available for their relevance and succinctness. This was to ensure ease of use yet to investigate a full range of learning styles and approaches. These were:

- preferred learning styles in the four dimensions: active/reflective, sensing/intuitive, visual/verbal and sequential/global first described by Felder and Silverman (1988);
- preferred approaches to study: deep or surface and the associated strategies as described by Biggs et al (2001) and
- preferred learning method and environment as researched in relation to subject of study by Jarvis and Woodrow (2001).

Felder and Solomon (1996) outline their four dimensions of learning mainly based on work by Kolb and Myers-Briggs as follows. Active learners tend to retain and understand information best by doing something active with it such as discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first. Sensing learners tend to like learning facts and established problem solving methods and intuitive learners prefer discovering possibilities and relationships.

Visual learners remember best what they see, pictures and diagrams, verbal learners get more out of words in written and spoken explanations. Sequential learners tend to gain understanding in linear steps whereas global learners tend to learn in large jumps aiming to see the big picture.

The deep and surface approaches described by Biggs (2001) in his revised study process questionnaire originated in work by Marton and Saljo (1976) and taken up by Entwhistle and Ramsden(1983) in the Approaches to Study Inventory. A deep approach is where the learner intends to understand the meaning of concepts whereas a learner taking a surface approach intends only to recall them, usually for examination.

Jarvis and Woodrow (2001) introduced the concepts of preferred leaning method and environment as well as individual learning styles and approaches in their study of learning preferences in relation to subjects of study of initial teacher training students. They found that certain methods and environments were associated with specific learning approaches, for example, a surface approach is associated with memorising and practising and lectures and a deep approach is associated with workshops, talking and discussing, listening and doing one's own research.

2. Method

An on-line survey of learning styles, approaches and preferred environments among first year undergraduates in a range of institutions across the UK that teach both Computing Science and Information Science / Management undergraduate degree programmes was set up. The original intention had been to test Optical Mark Reading for the processing of social science questionnaires and to visit the first years in lectures to distribute the questionnaires however, due to the researcher leaving her post in Information Science and the host University's Computer Aided Assessment (CAA) team's wish to test online surveying, an online questionnaire was devised and hosted on the CAA server at Loughborough University. The questionnaire (shown in Appendix 1) comprised Felder and Solomon's 44 item Index of Learning Styles described in Felder (1996), Biggs' (2001) 20 item Revised Study Process questionnaire and Jarvis and Woodrow's (2001) method for ranking learning environments and also asked for basic data such as year of study, institution and course.

Departments hosting Information Scientists at Queen Margaret University College and University of Wales Aberystwyth, those hosting Computer Scientists at Edinburgh University and Aberystwyth and those hosting both at Manchester Metropolitan University, Loughborough University and the University of Brighton all kindly agreed to take part.

First years in their first term at University were chosen for the survey as they had yet to become immersed in the styles and approaches linked to their respective department or school cultures. They were directly asked by their University tutor with responsibility for first year undergrads to visit the website and complete the questionnaire. Thus they are a self selected group of volunteers.

The results were exported from the online questionnaire into Excel in the form of a .csv file for simple data processing and then inferential statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS). Answers for the questions on each component learning style or approach inventory were totalled as instructed by their authors to give each participant a score for their preferred learning style on each of Felder's (1996) four dimensions, for their preferred approach to study (Biggs et al, 2001) and for their preferred learning environment and method (Jarvis and Woodrow, 2001). These scores were then cross-tabulated with the participant's discipline and any associations seen were tested for statistical significance using the Pearson chi-square. Clustered bar charts were used to display the cross-tabulations.

3. Results

It was immediately observable that by changing from a personally supervised questionnaire distribution to one inviting participation at a web site by email led to a massive drop in the expected response. For example only 16 responses were received from 125 potential Information Scientists at one University. In all 200 replies were received but of these:

- 2 were deleted as no information on course was given
- 17 had to be deleted as the course entered does not come under heading of information or computer science
- 6 responses in a row were exactly the same with the same spelling errors so 5 of these were deleted.
- 2 further responses in a row were exactly the same so 1 was deleted
- 40 responses were deleted as they were not from first years
- 1 was deleted as Computing and Info Management at Cardiff was entered as the course (neither Cardiff or UWA run this as a course)

This made a total of 66 unacceptable entries. It was clear that, though everyone involved in distributing information about the online survey had done their best to help, by going online there was a loss of control over sampling the original target population of first year Computer and Information Scientists.

Of the 134 accepted participants 88 were male and 46 female, 69 were computer scientists and 65 Information Scientists (participants following joint honours courses were classed by their host department or school).

The Gender * Discipline Cross-tabulation given in Table I below clearly demonstrates the male/female imbalances on these courses, the association between course and gender is statistically significant at $p<.001$ ($X^2 = 46.28$ with 1 degree of freedom).

Table I. Cross-Tabulation of Gender versus the two disciplines: Information and Computing Sciences

Cells contain frequency counts

		DISCIPLINE		Total
		Information Science	Computer Science	
GENDER	male	24	64	88
	female	41	5	46
Total		65	69	134

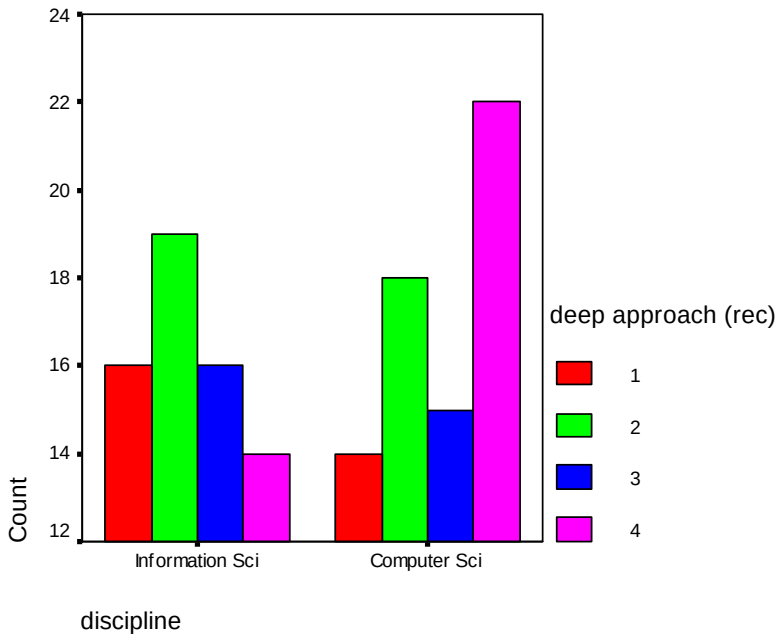
However, results linked to learning styles and approaches are less clear.

Scores for Information Scientists on Biggs' (2001) deep approach to learning scale ranged from 16 to 43 with a mean of 27.32 and were very similar to those for Computer scientists which ranged from 15 to 42 with a mean of 28. For a surface approach to learning the Information Scientists scores ranged from 11 to 37 with a mean of 20.95 and the Computer Scientists similarly ranged from 13 to 38 with a mean of 22.28.

The scores were then recoded into four groups 1- very low scores, 2- low to medium scores, 3- medium to high scores and 4- very high scores with each group containing approximately equal frequencies in order to cross-tabulate them as shown in Figure 1 below. This comparison of the scores of Information and Computer Scientists on their approaches to learning shows that more of the Computer Scientists are likely to follow a deep approach, being intrinsically interested and aiming for maximum understanding, than the Information Scientists.

Figure 1. Chosen Discipline versus Tendency to Adopt a Deep Approach to Learning

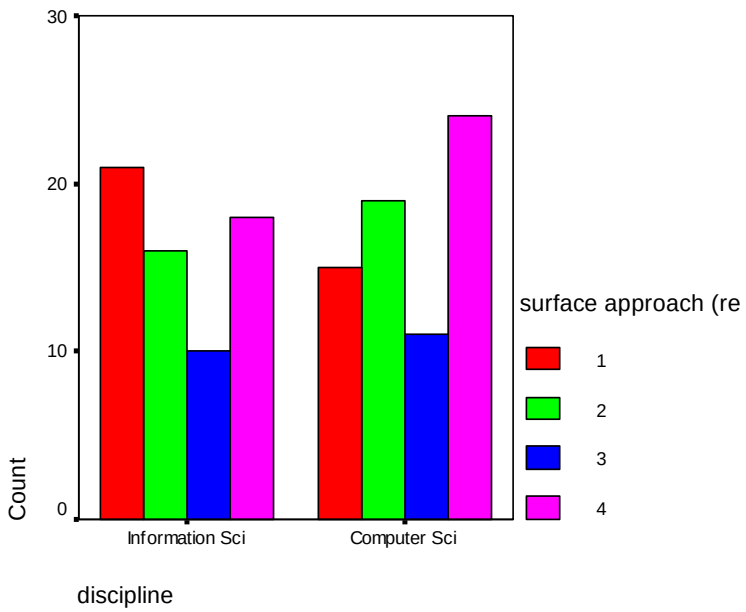
The magenta bars (labelled 4 in the key) represent numbers of students who scored most highly on a deep approach to learning and the red bars (labelled 1 in the key) those who scored least highly.



However, this difference is not statistically significant. Additionally the Computer Scientists are also very slightly more likely to follow a Surface approach (rote learning prompted through fear of failure) as shown in Figure 2 below.

Figure 2. Chosen Discipline versus Tendency to Adopt a Shallow Approach to Learning

The magenta bars (labelled 4 in the key) represent numbers of students who scored most highly on a shallow approach to learning and the red bars (labelled 1 in the key) those who scored least highly.

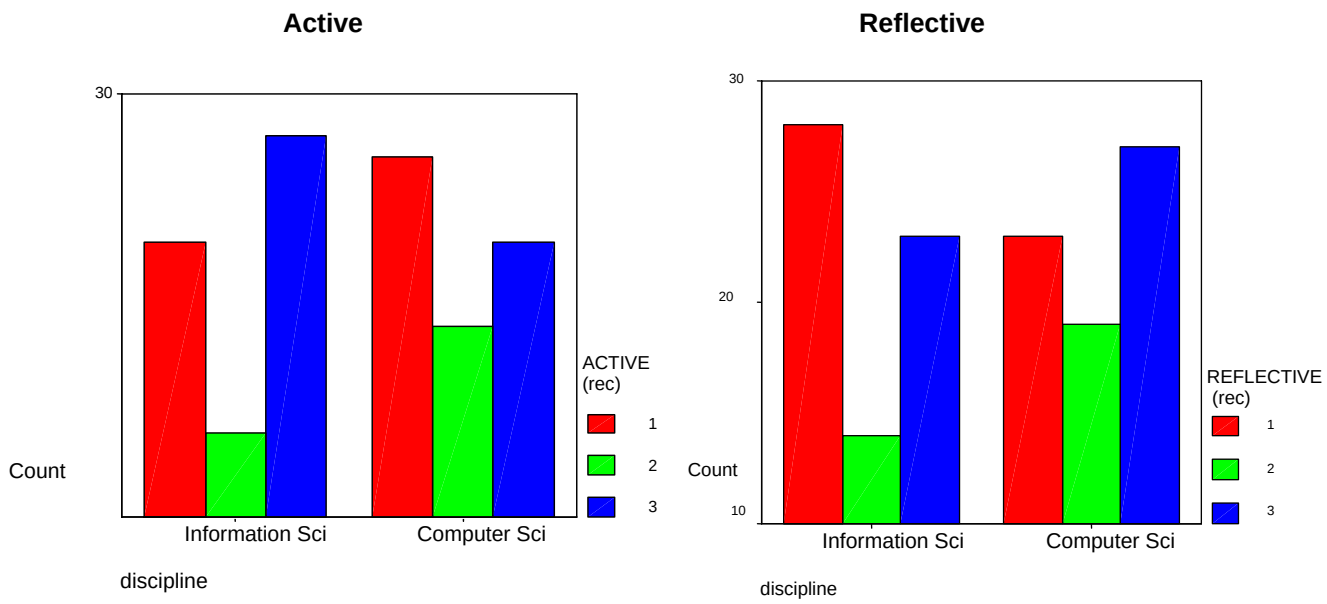


This indicates that the sample population of Computer Scientists is actually more diverse than that of Information Scientists containing members scoring highly on surface and deep approaches to learning. The group of Information Scientists is more coherent tending to be less likely to follow a deep approach.

Similar methods of analysis were used to investigate the relationship between Felder's (1996) individual learning styles and discipline. Where an association was shown to be statistically significant it is shown otherwise it can be assumed that no significant relationship was found.

Figure 3. Chosen Discipline versus Active or Reflective Learning Style

The blue bars (labelled 3 in the key) represent numbers of students who scored most highly on the shown learning style and the red bars (labelled 1 in the key) those who scored least highly.



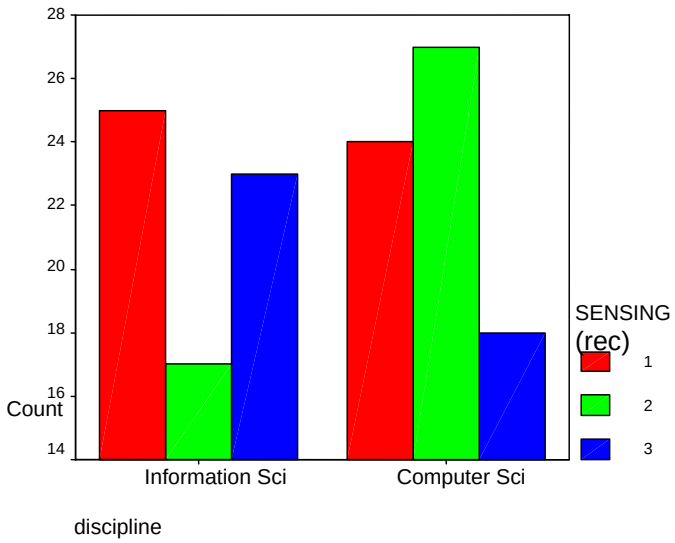
As shown in Figure 3 above both groups contained a range of active to reflective learners with the Information Scientists clearly being more likely to be at the extremes of the scale than the middle. Computer Scientists also follow this trend but less obviously and additionally, are slightly less likely to be active learners than the Information Scientists preferring to reflect on the information to be learned individually rather than manipulating the material or working with it in groups.

Figure 4 below shows the intuitive (discovering possibilities and relationships) versus the sensing (learning facts and established methods for problem solving) dimension of learning.

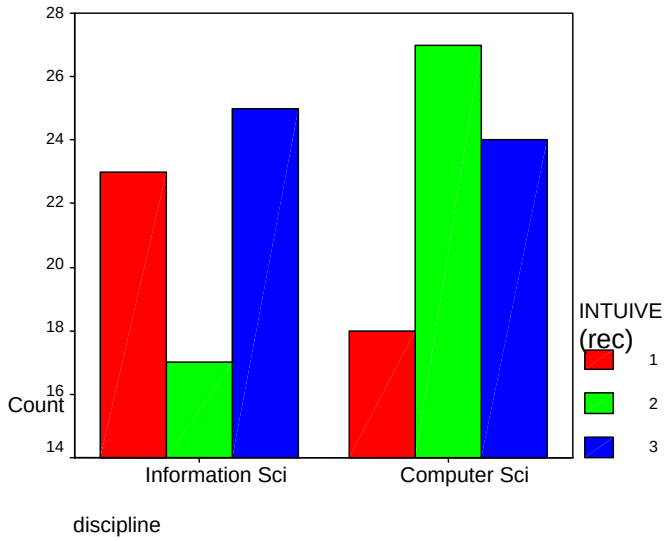
Figure 4. Chosen Discipline versus Intuitive or Sensing Learning Style

The blue bars (labelled 3 in the key) represent numbers of students who scored most highly on the shown learning style and the red bars (labelled 1 in the key) those who scored least highly.

Sensing



Intuitive

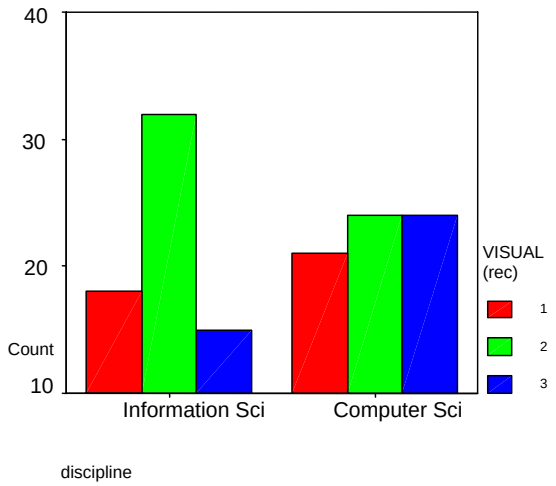


It can be seen immediately that Computer Scientists tend to be centrally sited on this dimension but Information Scientists tend to its extremes with the sample divided into containing both sensing and intuitive learners. However, Computer Scientists are more likely to be intuitive learners than sensing learners but the sample population of Information Scientists contained equal numbers of both.

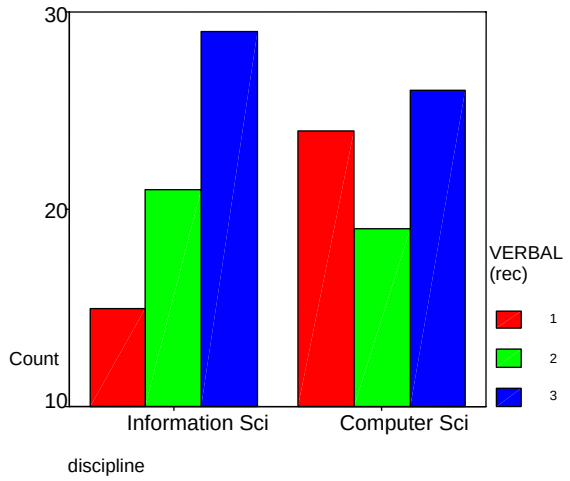
Figure 5. Chosen Discipline versus Visual or Verbal Learning Style

The blue bars (labelled 3 in the key) represent numbers of students who scored most highly on the shown learning style and the red bars (labelled 1 in the key) those who scored least highly.

Visual



Verbal

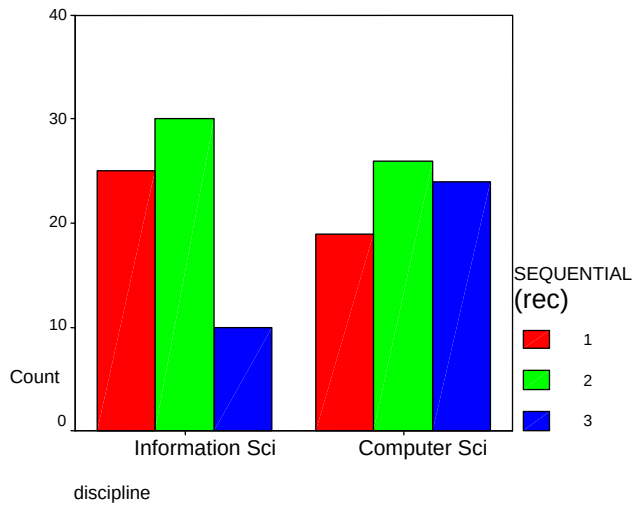


As shown in Figure 5 above Information Scientists are clearly mostly verbal learners preferring working with text to diagrams but Computer Scientists are more diverse with members of the sample population scoring both strongly and weakly on the verbal learning dimension.

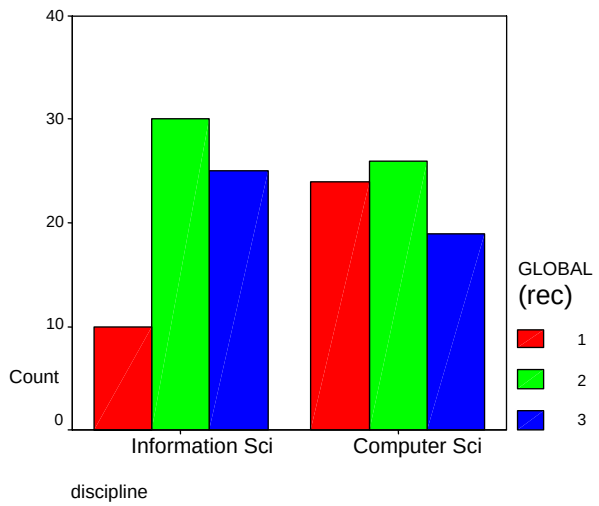
Figure 6. Chosen Discipline versus Sequential or Global Learning Style

The blue bars (labelled 3 in the key) represent numbers of students who scored most highly on the shown learning style and the red bars (labelled 1 in the key) those who scored least highly.

Sequential



Global



The charts in Figure 6 above show that Computer Scientists are more likely than Information Scientists to be sequential learners preferring to gain understanding in linear steps, the Information Scientists tend to be more global learners preferring to see the 'big picture' first. However, neither discipline is very strongly oriented in that direction as most participants are in the mid range. These associations between discipline and preferences toward sequential or global learning though are statistically significant at $p<.05$ ($X^2 = 6.76$ with 2 degrees of freedom).

The results for the most preferred learning method and environment measured using Jarvis and Woodrow's (2001) questions are shown in Table II below. It is clear that more Information Scientists than Computer Scientists prefer talking and discussing as a method of learning whereas Computer Scientists are much more likely to prefer solving problems. Hearing an explanation was the second most popular method of learning for both groups.

Table II. Cross-tabulation showing numbers in chosen discipline versus most preferred learning method

		discipline		
		Information Science	Computer Science	Total
Most preferred method	Hearing an explanation	17	15	32
	Talking and discussing	28	12	40
	Reading books	4	8	12
	Reading on-line		2	2
	Solving problems	16	32	48
Total		65	69	134

This association between discipline and most preferred method is statistically significant at $p<.01$ ($X^2 = 15.09$ with 4 degrees of freedom). As shown below, by far the least preferred method for both groups is reading journals. Reading online is also surprisingly unpopular given the increasing tendency of students to rely on the Internet.

Table III. Cross-tabulation showing numbers in chosen discipline versus least preferred learning method

		discipline		
		Information Science	Computer Science	Total
Least preferred method	Hearing an explanation	4	6	10
	Talking and discussing	2	3	5
	Reading books	7	2	9
	Reading journals	32	42	74
	Reading on-line	12	14	26
	Solving problems	7	2	9
Total		64	69	133

The most preferred environment also differs with discipline as shown in Table IV below but not statistically significantly however, double the number of Computer Scientists to Information Scientists prefer individual research and vice versa for seminar discussion. This fits well with the earlier finding that Computer Scientists are more likely to be reflective and Information Scientists active learners. Practical workshops are virtually as popular as seminar discussion is with Information Scientists and individual research is with computer scientists indicating that they would go down well with both groups.

Table IV. Cross-tabulation showing numbers in chosen discipline versus most preferred learning environment

		discipline		
		Information Science	Computer Science	Total
Most preferred environment	Lectures	10	10	20
	Seminar Discussion	18	9	27
	Small group tasks	9	10	19
	Practical workshop	17	19	36
	Individual research	10	21	31
Total		64	69	133

As shown in Table V below, lectures are the least preferred environment for computer scientists but seminar discussion comes only just behind, Information Scientists also dislike lectures but not quite as much as small group tasks. Interestingly individual research appears quite highly under least preferred environment for Computer Scientists as well as being the most likely preferred option indicating a diverse group.

Table V. Crosstabulation showing numbers in chosen discipline versus least preferred learning environment

		discipline		
		Information Science	Computer Science	Total
Least preferred environment	Lectures	18	20	38
	Seminar Discussion	4	18	22
	Small group tasks	21	6	27
	Practical workshop	6	9	15
	Individual research	16	16	32
Total		65	69	134

The association between discipline and least preferred environment is statistically significant at p=.001 (X^2 = 17.84 with 4 degrees of freedom).

4. Discussion

The observed male female imbalances were confirmed, with just over a third of respondents from Information Science being male and only 7% of respondents from Computer Science being female. Margolis and Fisher (2003) report that they have encouraged a higher percentage of female

applicants to Computer Science at an US University by providing a variety of modules in year one to allow for a range of initial computing experience and in the following years by moving to more interdisciplinary teaching with other departments to add context.

Concerning Biggs et al's (2001) learning approaches, from the sample and shown in Figure 1 it appeared that Computer Scientists were more likely than Computer Scientists to follow a deep approach aiming to understand than a surface approach aiming to remember. This could be linked to the greater proportion of males in that group as Severiens and Ten Dam (1997) showed that the males in their study were less likely to be reproduction oriented learners than the females. However, the reproduction oriented learning style is also associated with stepwise processing which is clearly linked to Felder and Silverman's (1988) sequential learning style and Figure 6 shows that Computer Scientists are significantly ($p<.05$) more likely than Information Scientists to be sequential learners.

Another result apparently linked to the gender imbalance was the finding shown in Figure 4 that Computer Scientists were more likely to be intuitive learners looking for possibilities and relationships than sensing learners learning facts and established methods. This confirms Severiens and Tens Dam's (1997) finding that men were more likely to prefer an undirected style with a lack of regulation and stimulation. But yet again there is conflict within this study as the Computer Scientists were slightly more likely than Information Scientists to be reflective learners, preferring to think things through rather than trying them out immediately.

Perhaps, not unexpectedly, Information Scientists were found to be strongly verbal learners preferring to work with words rather than diagrams and were more likely to be global learners than sequential learners preferring to have opportunities to help them see the 'big picture'. This last finding was statistically significant at $p<.05$ and is particularly relevant to Information Science lecturers who should employ advance organisers (Ausubel, 1968) in their teaching. These are devices such as overviews, summaries, lists of objectives or even stories used in the introduction of a topic to enable learners to orient themselves to the topic, so that they can see where the new information will fit in and how it links with what they already know. This approach has also been found to be successful in multimedia and distance learning (Coffey and Canas).

Concerning preferred learning methods, as shown in Table II, more than twice as many Information Scientists than Computer Scientists prefer talking and discussing as a method of learning whereas Computer Scientists are significantly more likely than Information Scientists ($p<.05$) to prefer solving problems.

As shown in Table III reading journals is by far the least preferred method of learning for both disciplines, so much so that it would seem that teaching students how to go about finding and tackling a journal article needs to be more proactively taught in both Information and Computing Science in order for students to utilise up to date published research information in their learning.

Results concerning learning environment, shown in Tables IV and V are less clear. On the whole Computer Scientists are more likely to prefer individual research as a learning environment than Information Scientists, however, a significant group of Computer Scientists disliked individual research. Information Scientists are more likely to prefer seminar discussion than Computer Scientists and practical workshops are popular learning environments with both groups. Lastly lectures are unpopular with both disciplines though it was found Information Scientists like small group tasks even less, much less so than Computer Scientists.

5. Conclusions

There was a wide variety of individual learning styles and approaches in the sample population and it was difficult to say where differences lay. It would not be safe to conclude that any one approach would meet the needs of an entire cohort of Information or Computer Scientists as whenever an overall tendency appeared there was always at least a small but significant proportion who had an opposite preference despite the obvious gender differences in the two cohorts. For instance, concerning approach to learning, the Computer Scientists appeared to be more polarised than the Information Scientists with approximately a third of the group preferring to follow a surface approach and another third a deep approach.

The online questionnaire set up by the Computer Aided Assessment team worked very well from the operator's perspective producing an Excel file that could be immediately loaded into SPSS for analysis. In fact posting an online questionnaire proved to be an easy way to collect data but, unfortunately, the data received becomes beyond the researcher's immediate control. The following conclusions should be read knowing that they refer to a sample of volunteers requested by their tutor to complete an online survey of Information and Computer Scientists. The response rate for each university involved varied and a more comprehensive survey would need to be carried out before the results of this study can be generalized to the UK undergraduate population.

In conclusion, it can be said that despite similarities between many of the modules taught on Information and Computing Science undergraduate degrees they are attracting different types of learners. However, within each cohort there are individuals with a range of learning styles and approaches, preferred learning methods and environments. It is proposed that lecturers should prepare their students for study in a variety of styles, approaches and environments, and through different methods rather than always try to cater for their immediate preferences as shown here. Two key points for lecturers to note are the use of advance organisers in teaching and the need to prepare students for and to support them in the use of journals.

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7. Appendix 1

Study Process Questionnaire

This questionnaire has a number of questions about your attitudes towards your studies and your usual way of studying.

There is no right way of studying. It depends on what suits your own style and the course you are studying. It is accordingly important that you answer each question as honestly as you can. If you think your answer to a question would depend on the subject being studied, give the answer that would apply to the subject(s) most important to you.

Please choose the one most appropriate response to each question. Select the option that best fits your immediate reaction. Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item.

Do not worry about projecting a good image. Your answers are CONFIDENTIAL.

Thank you for your co-operation.

About you

Age: ☐

Gender: Male ☐ / Female ☐

Course: ☐

Year: First ☐ / Second ☐ / Final ☐

Institution: ☐

Section A

Select which most applies to you.

	never or only rarely true of me	sometimes true of me	true of me about half the time	frequently true of me	always or almost always true of me
I find that at times studying gives me a feeling of deep personal satisfaction.	☐	☐	☐	☐	☐
I find that I have to do enough work on a topic so that I can form my own conclusions before I am satisfied.	☐	☐	☐	☐	☐
My aim is to pass the course while doing as little work as possible.	☐	☐	☐	☐	☐

	never or only rarely true of me	sometimes true of me	true of me about half the time	frequently true of me	always or almost always true of me
I only study seriously what's given out in class or in the course outlines.					
I feel that virtually any topic can be highly interesting once I get into it.					
I find most new topics interesting and often spend extra time trying to obtain more information about them.					
I do not find my course very interesting so I keep my work to the minimum.					
I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.					
I find that studying academic topics can at times be as exciting as a good novel or movie.					
I test myself on important topics until I understand them completely.					

	never or only rarely true of me	sometimes true of me	true of me about half the time	frequently true of me	always or almost always true of me
I find I can get by in most assessments by memorising key sections rather than trying to understand them.					
I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.					
I work hard at my studies because I find the material interesting.					
I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes.					
I find it is not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics.					
I believe that lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.					
I come to most classes with questions in mind that I want answered.					
I make a point of looking at most of the suggested readings that go with the lectures.					
I see no point in learning material which is not likely to be in the examination.					
I find the best way to pass examinations is to try to remember answers to likely questions.					

Section B: Learning Environment

Please rank the following from 1 to 5, giving 1 to your preferred environment for learning and 5 to your least favourite environment for learning. Tip: Please make sure you've ranked each option once.

Rank 1 Select most preferred learning environment:

Rank 2 Select 2nd most preferred learning environment:

Rank 3 Select 3rd most preferred learning environment:

Rank 4 Select 4th most preferred learning environment:

Rank 5 Select least preferred learning environment:

Section C: Learning Method

Please rank the following from 1 to 6, giving 1 to your preferred method for learning and 6 to your least favourite method for learning. Tip: Please make sure you've ranked each option once

Rank 1 Select most preferred learning method:

Rank 2 Select 2nd most preferred learning method:

Rank 3 Select 3rd most preferred learning method:

Rank 4 Select 4th most preferred learning method:

Rank 5 Select 5th most preferred learning method:

Rank 6 Select least preferred learning method:

Section D: Index of Learning Styles

Directions: Click on 'Select one:' to select 'a' or 'b' to indicate your answer to every question. If both 'a' or 'b' seem to apply to you, choose the one that applies more frequently.

1. I understand something better after I (select one...)

2. I would rather be considered (select one...)

3. When I think about what I did yesterday, I am most likely to get (select one...)

4. I tend to
(select one...)

5. When I am learning something new, it helps me to (select one...)

6. If I were a teacher, I would rather teach a course
(select one...)

7. I prefer to get new information in (select one...)

8. Once I understand (select one...)

9. In a study group working on difficult material, I am more likely to
(select one...)

10. I find it easier (select one...)

11. In a book with lots of pictures and charts, I am likely to
(select one...)

12. When I solve maths problems
(select one...)

13. In classes I have taken (select one...)

14. In reading nonfiction, I prefer
(select one...)

15. I like teachers (select one...)

16. When I'm analyzing a story or a novel
(select one...)

17. When I start a homework problem, I am more likely to
(select one...)

18. I prefer the idea of (select one...)

19. I remember best (select one...)

20. It is more important to me that an instructor
(select one...)

21. I prefer to study (select one...)

22. I am more likely to be considered (select one...)

23. When I get directions to a new place, I prefer (select one...)

24. I learn
(select one...)

25. I would rather first (select one...)

26. When I am reading for enjoyment, I like writers to
(select one...)

27. When I see a diagram or sketch in class, I am most likely to remember
(select one...)

28. When considering a body of information, I am more likely to
(select one...)

29. I more easily remember (select one...)

30. When I have to perform a task, I prefer to (select one...)

31. When someone is showing me data, I prefer (select one...)

32. When writing a paper, I am more likely to
(select one...)

33. When I have to work on a group project, I first want to
(select one...)

34. I consider it higher praise to call someone (select one...)

35. When I meet people at a party, I am more likely to remember
(select one...)

36. When I am learning a new subject, I prefer to
(select one...)

37. I am more likely to be considered (select one...)

38. I prefer courses that emphasize (select one...)

39. For entertainment, I would rather (select one...)

40. Some teachers start their lectures with an outline of what they will cover. Such outlines are (select one...)

41. The idea of doing homework in groups, with one grade for the entire group, (select one...)

42. When I am doing long calculations, (select one...)

43. I tend to picture places I have been (select one...)

44. When solving problems in a group, I would be more likely to (select one...)

Thank you for taking part!

Now please click the submit button Submit