An Empirical Examination of Undergraduate Students' Module Choices

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Abstract

Modularisation aims to provide increased learner choice and flexibility. Analysis of the reasons for the choice of an introductory finance module by non-specialist students identifies three clusters of students. The first cluster chose the module because they thought it would be easy or they could gain a high mark. The second (largest) cluster made their choice based on interest in the subject. The third cluster were students for whom the module was compulsory. Students who chose out of interest enjoyed the module more, maintained their interest and spent more hours studying. Students in the other two clusters focused on just passing the assessment. Entwistle's Approaches to Studying Inventory was adopted to test the influence of learning styles on module choices. Students who chose out of interest were more likely to adopt a deep learning style than the other two groups. Students are, therefore, recommended to make their module choices on the basis of their interest in a subject rather than for other reasons. Lecturers should be aware that the students on their module might have varying levels of interest and motivations for study. Lecturers are recommended to consider ways of increasing the level of deep learning by exploring alternative methods of assessment and increasing student involvement and choice.

Keywords: module choice, learning styles, empirical research.

Introduction

Modular courses emphasise student choice and learner flexibility (Jenkins & Walker 1994). However, there is some debate as to whether this is at the expense of coherence and progression (Roper 1994). Some lecturing staff have suggested that students' motives for module choice do not revolve around their interest in a subject or the strategic fit between modules but stem from a desire to find the easiest way to obtain the highest marks. Whilst there is an abundance of anecdotal evidence and opinion, there is very little reliable hard evidence on the reasons for higher education students' curricular choices. Most of the research on curricular choice is conducted in secondary education and revolves around the choice or preference for science or art subjects.

Where students are able to choose modules that are personally relevant to them, better or deeper learning is expected to take place (Beard and Hartley 1984; Gibbs 1992). Therefore, if students choose modules because they are interested in the subject they will adopt a learning style that emphasises understanding (Entwistle 1981). Conversely, if they choose a module because they hope it will be easy, or for other reasons unrelated to the subject matter, students are more likely to adopt a surface approach to learning (Marton and Saljo 1976, 1996). Surface learning styles emphasise memorisation and lead to poorer quality learning outcomes: students have little understanding and only short-term recall of information (Gibbs 1995). Higher education institutions aim to encourage deep learning (Brown and Race 1995; O'Neil 1995; Race 1993, 1999). However, there is not enough evidence to establish whether all students share educators' aim of deep learning. Certainly, anecdotal evidence would suggest that some students adopt an instrumental strategy where satisfaction of the assessment requirements is their main aim (Entwistle 1981 and Race 1999). Consider the number of times lecturers are asked questions such as "Will this be on the exam?" Where students are focusing on assessment rather than learning they will adopt a surface approach to learning if the assessment encourages it. For example, closed book exams often lead to surface learning particularly where students

are rewarded for memorisation. In addition, closed book exams provoke high levels of anxiety about the assessment, which is suggested as a cause of surface learning (Gibbs 1992).

It is important, therefore, to examine the influences on students' module choices because they may affect the quality of learning outcomes. This study aims, first of all, to examine the reasons given for choice of modules. The relative importance of reasons is explored including interest in the subject, assessment procedures, perceived level of difficulty and practical considerations. Discrete groups of students are identified on the basis of the importance of particular reasons in their choices. The study then tests whether these groups of students differ in terms of their adopted learning style and other characteristics. Evidence is provided from a cohort of non-specialist students taking an introductory finance module and relates to their reasons for choice of modules in general and choice of that particular module.

A review of the relevant literature follows. The methodology is then discussed followed by a description of the sample of students. The empirical results are presented, wherein three groups of students are identified and compared. The conclusion summarises the results and highlights some of their implications.

Learning Styles

Students have different abilities, personalities and motivations, which lead to differing styles of learning (Entwistle 1981; Hartley 1998). However, whilst each student is clearly an individual, patterns of learning styles have been recognised since at least as early as Isaac Watts (1810). The most frequently discussed distinction is between deep and surface approaches to learning, with their respective emphases on understanding and memorising (Marton and Saljo, 1976; Gibbs 1995; O'Neil 1995). It should be noted that learning styles are not fixed and students may vary their strategy depending on the situation (Laurillard 1979; Hartley 1998). Surface learning is associated with heavy workloads, high contact hours, excess course material, little opportunity for in-depth study, anxiety provoking assessment and, of particular relevance in this context, lack of choice over subject or method of study (Dahlgren 1978; Gibbs 1992). Fransson (1977) further identified an association between surface learning and students who lacked interest in the subject. Therefore, the increased choice available on modular courses should encourage deep learning if students are choosing modules because they are interested in them and not for other reasons. However, some would argue that modular courses can provide less opportunity for in-depth study, leading to more surface learning especially where freedom of choice leads to incoherent, fragmented courses (Jenkins and Walker 1994).

Entwistle (1981) developed the concept of deep and surface learning by identifying three main learning styles, which he labelled 'reproducing', 'meaning' and 'achieving' orientations. A 'reproducing' orientation indicates a surface approach to learning with the emphasis on memorisation and just passing the course. A 'meaning' orientation indicates what has traditionally been seen as the deep approach to learning, emphasising understanding and extracting meaning from the subject. An 'achieving' orientation indicates competitiveness, well-organised study methods and hope for success. Such students are oriented to do well whatever this involves and adopt the strategy that they expect to achieve their objective. We might, therefore, expect students with an achieving orientation to switch between deep and surface styles of studying depending on what the characteristics of individual modules promote. Biggs (1976) using the Study Process Questionnaire independently identified three similar learning strategies and associated motivations, which supports the validity of Entwistle's model.

Influences on Choices

Entwistle (1981) argued that students choose subjects that reflect their personality, the most notable difference being between arts and science students. Ramsden and Entwistle (1981) further suggest that specific characteristics of departments influence student learning styles. Departments with heavy workloads and a lack of freedom in

learning were associated with a 'reproducing' orientation whereas departments with a higher level of freedom were associated with a 'meaning' orientation. Science and engineering subjects typically have more contact hours and less freedom across the majority of their modules, whereas art subjects provide greater freedom (Ramsden and Entwistle 1981). In this particular study, there are a large number of engineering students, who are, therefore, expected to be more likely to adopt a 'reproducing' learning style. It follows that if there are differences in learning styles between faculties there might also be different reasons for students' module choices.

Jenkins and Walker (1994) found that students considered the mix of modules in making their choices and looked to build up a balanced portfolio of skills. They also found that some students chose on the basis of the module process rather than content, for example avoiding modules with group work (Jenkins and Walker,1994). Clearly, if process reasons predominate intellectual coherence and progression could be at risk.

To summarise, there is very little research on curricular choices in higher education. The literature review has identified that students who choose modules because they are interested in the subject are expected to be more likely to adopt a deep approach to learning than students who choose for other reasons. Students from faculties with greater freedom in learning are also expected to be more likely to adopt a deep (meaning) approach to learning. In the specific context of this study, students on the introductory finance module might be expected to be more likely than average to adopt a 'reproducing' learning style for a number of reasons. Assessment of the module is 100% closed book examination; students are mainly taught in one very large group; the cohort includes a high proportion of science and engineering students. The following section describes how this study was designed to examine the relative importance of different reasons for module choices and to test expected links with learning styles.

Methodology

The module examined is 'Introduction to Finance' which is available to non-specialist students from any faculty, i.e. anyone not studying finance, management or industrial economics. The data are derived from a survey questionnaire administered during a lecture. The questionnaire was developed from the literature review and informal discussions with students and staff regarding motivations for module choices. Students' motivations included their interest in the subject, perceived usefulness on their CV, mode of delivery and method of assessment. Fellow lecturers divided into two camps. One group tended to suggest that students chose introductory modules because they expected them to be easy. Others argued that the high demand for these modules was motivated out of interest in business subjects. Entwistle's Approaches to Studying Inventory (ASI) was selected as the tool for testing the influence of learning styles on module choices. The survey questionnaire was administered to the full cohort of students.

The questionnaire collected background information on each student's age, gender, nationality, current study patterns and whether they had specific career plans. ASI (Entwistle 1981, 57-60) was reduced to the three main learning style orientations, i.e. 'achieving, reproducing and meaning'. The third part of the questionnaire collected data on the importance of different criteria in generally selecting optional modules. The final part examines the importance of suggested reasons for selection of the introductory finance module. It should be noted that the module is compulsory for second year Mechanical Engineering students and, therefore, they were analysed separately. Students were also questioned about their current attitudes towards the module in order to identify the relative emphasis placed on the learning experience compared to assessment. The validity of the survey instrument was increased by the presence of the lecturer allowing meaning or ambiguities to be clarified.

Significance tests between sub-group means were conducted using parametric (Student's t-test and one way ANOVA) and non-parametric (chi square, Kruskal Wallis and

Mann Whitney) tests on the continuous and ordinal variables respectively. Discrete groups of students were identified using cluster analysis.

Description of Sample

The sample consisted of 135 complete responses. 97 students (72%) were male and 38 female (28%). 39% of the sample were mechanical engineering students, for whom the module is compulsory and who are almost exclusively male. There were 20 students (15%) for whom English was not their native language. Table 1 shows that 96% of the students were 22 years old or younger. The sample is not representative of the general population of students but reflects the

Age	Frequency	Percent
18	16	12
19	47	35
20	36	27
21	24	18
22	6	4
23-29	5	4
30+	1	1
Total	135	100

Table 1: Ages of Respondents

composition of students on one specific module.

Students were studying for a wide range of full time undergraduate degrees. Table 2 shows that there is a bias away from arts students and that a high proportion of students were on engineering, maths and computing degrees. Although the module is available to all students and does indeed attract a wide variety of students, the sample is not representative of the population of students and, therefore, results can only be generalised to this particular profile of student group.

Analysis

The analysis first of all considers reasons for choices of optional modules in general. It then examines the introductory finance module and identifies three distinct groups of students:

Degree code	includes	Number of students	Percent of respondents
ART	Arts and Humanities	9	7
BUS	Business school degrees	20	15
EC	Economics, law	11	8
ENG	Other engineering	9	7
MECH	Mechanical engineering	58	43
SCI	Science, maths, computing	28	21
Total		135	100

Table 2: Degree Studied by Respondents

those who chose out of interest; those who chose because they thought it would be easy and those for whom it was a compulsory module. The analysis then tests whether there are differences in the learning styles and characteristics of the three groups.

Students rated the importance of each of 12 reasons for the choice of optional modules on a 5 point Likert scale. Table 3 presents the results ranked in order of importance. Reasons that were rated most important were interest in the subject and relevance to future career options. 79% rated interest important or very important and almost 78% considered relevance to their future career. The strategic fit with other modules was a consideration for 58% and 54% thought about the effect that a module choice had on their c.v. It was encouraging to note that 48% thought it was important that modules should be fun. The method of assessment was an important consideration for 49% of the students but very few students appeared to take the amount of group work into consideration, in contrast to Jenkins and Walker (1994). Overall, looking for easy modules was ranked 7th out of the 12 reasons with 42% of students rating it as important or very important. Less important reasons were professional accreditation, convenient time or day, looking for a

Reason	Percentage of respondents					Mean
	Not at all important 1	2	3	4	Very important 5	
Interest in the subject	1.6	1.6	17.7	35.5	43.5	4.18
Relevance to future career	0	4.8	17.6	40.8	36.8	4.10
Strategic fit with other modules	6.4	6.4	28.8	44.0	14.4	3.54
Looks good on c.v.	7.2	8.0	31.2	40.8	12.8	3.44
Expect it will be fun	8.0	15.2	28.0	38.4	10.4	3.28
Method of assessment	9.6	11.2	30.4	40.0	8.8	3.27
Expect it will be easy	8.8	16.0	33.6	26.4	15.2	3.23
Professional accreditation	13.7	12.9	32.3	25.0	16.1	3.17
Convenient time or day	16.0	15.2	31.2	25.6	12.0	3.02
Expect it will be challenging	7.2	17.6	48.8	22.4	4.0	2.98
Involves group work	17.6	22.4	46.4	12.0	1.6	2.58
Preference for lecturer	27.0	18.9	34.4	17.2	2.5	2.49

Table 3: Importance of Reasons for Module Choices Generally

challenge, group work and thee least important was students' preferences for a particular lecturer.

There are, therefore, some encouraging signs that students are choosing out of interest and considering the strategic fit of modules. It is also interesting that 'fun' ranked much higher than more mundane reasons and that the content of modules is much more important than lecturers are. However, it should be noted that almost half the students thought it was important that modules were easy.

The analysis now considers reasons for choosing the introductory finance module to see if a similar pattern exists. Table 4 shows, once again, that reasons with the highest mean scores were all to do with interest in the subject (interest in the subject; learn more about the subject; wanted to do a finance module). There was some evidence of students looking for an 'easy' module. 38.7% rated the reason 'I thought it would be easy' important or very important and 35.9% rated 'I thought I could gain a high mark' important or very important.

Cluster analysis identified that students could be separated into two distinct groups based on whether they rated 'interest' or 'easy' reasons more highly. The results in Table 5 highlight

Code	Reason	Percentage of respondents					Mean
		Not at all important 1	2	3	4	Very important 5	
V9	I wanted to learn more about the subject	4.9	6.8	29.1	33.0	26.2	3.69
V1	Interest in the subject	4.6	8.3	28.7	34.3	24.1	3.65
V4	I really wanted to do a finance module	5.8	11.7	29.1	27.2	26.2	3.56
V10	I really enjoy business subjects	6.9	13.7	30.4	26.5	22.5	3.44
V5	I thought I could gain a high mark	5.8	19.4	38.8	20.4	15.5	3.20
V2	I thought it would be easy	8.5	17.0	35.8	24.5	14.2	3.19
V7	I thought it would look impressive on my c.v.	11.7	15.5	36.9	24.3	11.7	3.09
V6	I thought it would be challenging	6.8	16.5	46.6	22.3	7.8	3.08
V3	Convenient time/day	17.1	14.3	33.1	27.6	7.6	2.94
V8	I prefer modules which are 100% exam	20.4	17.5	35.9	15.5	10.7	2.79
V11	It was the only module with space on it	51.5	15.5	29.1	3.9	0	1.85

Table 4: Importance of Reasons for Choice of Introduction to Finance (Students for whom the module is compulsory are excluded)

that students in Group 1 rated 'I thought it would be easy' and 'I thought I could gain a high mark' more important. Group 2 had higher scores for the variables that measure interest in the subject (V1, V4, V9, V10). Interestingly, Group 2 also scored higher on the reason 'I thought it would be challenging' (V6). It should also be noted that students who chose out of interest formed the larger group with 52 respondents compared to 26. Previous discussion indicated that there are likely to be differences in learning styles between the clusters. Three clusters are compared Group 1 (EASY; n=26), Group 2 (INTEREST; n=52) and Group 3 (CORE; n=57). Group 3 consisted entirely of mechanical engineering students for whom the module is compulsory and who are almost all male. Statistical analysis on the composition of the other two groups showed no significant difference between faculties nor between arts and science indicating that there is no relationship between faculty and the prevalence of 'easy' or 'interest' reasoning. However, a major limitation is the lack of

Code	Reason	Group 1 EASY	Group 2 INTEREST	F ratio	Sig*
V2	I thought it would be easy	***3.69***	3.10	4.41	.039
V5	I thought I could gain a high mark	***3.73***	3.12	5.17	.026
V11	It was the only module with space on it	***1.96***	1.48	4.76	.032
V1	Interest in the subject	2.73	***4.40***	103.5	.000
V9	I wanted to learn more about the subject	2.62	***4.37***	77.27	.000
V4	I really wanted to do a finance module	2.42	***4.33***	79.86	.000
V10	I really enjoy business subjects	2.62	***4.08***	34.38	.000
V6	I thought it would be challenging	2.42	***3.37***	18.16	.000
V7	I thought it would look good on my c.v.	2.54	***3.37***	8.79	.004

Note: ***bold italics*** indicate which group has higher value for each variable.
*all variables showed statistically significant differences between groups (at 5% level)

Table 5: Cluster Analysis of Reasons for Choosing Introduction to Finance Module: final cluster centres

information on students who did not choose the module and their reasoning.

The Approaches to Studying Inventory was employed as an indication of learning styles. Students rated their level of agreement with 18 statements on a five point scale. Answers were aggregated for each of the three main learning styles, 'achieving', 'reproduction' and 'meaning', in accordance with Entwistle, 1981. In this context, students might be expected to score higher on the 'reproducing' learning style, which represents surface learning, for a number of reasons. Delivery of the module includes low contact hours and assessment is 100% by closed book examination. Students are non-specialists and might, therefore, consider this module less important than their specialist subjects.

Table 6 presents descriptive statistics on learning styles for the whole sample and compares them with population statistics. These results show that, as expected in this context, students score higher than the national average on 'achieving' and 'reproducing' learning styles and lower on 'meaning'. No significant learning style differences were detected between faculties, gender or different ages.

Comparison of the learning styles for each of the three groups did show some differences. As expected, group 2 (INTEREST) scored significantly higher on the 'meaning' and 'achieving' scales, suggesting that students who choose out of interest are more likely to adopt a deep approach to learning. However, contrary to predictions, there were no

Style	n	minimum	maximum	Sample mean	Sample standard deviation	National mean*	National standard deviation*
Achieving	131	5.0	22.0	14.11	3.06	12.82	4.26
Reproducing	130	4.0	23.0	15.20	3.36	16.51	4.40
Meaning	132	4.0	20.0	12.09	3.35	14.31	4.51

* source Thomas (1995)

Table 6: Approaches to Studying: Sample Statistics.

significant differences between groups on the 'reproducing' scale indicating that the level of surface learning was fairly consistent across all the groups.

It might be expected that students who choose modules out of interest study longer hours. Table 8 shows that, on average, students spent a total of 27 hours per week studying, which consisted of 14.5 contact hours and 12.5 hours of independent study. It is interesting to note that the range of total hours varied from 10 up to 90 hours (although 90 was an outlying value). As predicted, Table 8 shows that students in the INTEREST group engage in significantly more independent study, spending, on average, 16 hours per week studying independently compared to 11 hours for the EASY group and 10 hours for the CORE group.

Having determined reasons for choices, it is interesting to examine whether this has any relationship with students' attitudes towards

Style	Group 1 (EASY)	Group 2 (INTEREST)	Group 3 (CORE)	Significance (ANOVA)
Achieving	12.92	14.94	13.87	0.020**
Reproducing	14.48	15.33	15.42	0.491
Meaning	10.92	13.29	11.40	0.002***

***, **, statistically significant difference between group means at 1% and 5% respectively

Table 7: Approaches to Studying: comparison of group means

Style	Sample Mean	Group 1 (EASY)	Group 2 (INTEREST)	Group 3 (CORE)	Significance (ANOVA)
Contact hours	14.5	12.0	13.0	17.0	0.000***
Independent study	12.5	11.2	15.9	10.3	0.011**
Total hours	27.0	23.2	29.0	27.3	0.092*

***, **, * statistically significant difference between group means at 1%, 5% and 10% respectively.

Table 8: Hours Spent Studying: Comparison of Group Means.

learning outcomes. Students indicated their level of agreement with 8 statements regarding the Introduction to Finance module on a five point scale, where 1 was equivalent to definitely disagree and 5 represented definitely agree. Statistical differences between groups were identified using Kruskal Wallis non-parametric test. The results in Table 9 show that students who chose out of interest (Group 2) are significantly more likely to be really enjoying the module; aiming for a high mark; expect to apply what they have learned in the future; and have maintained their high interest in the subject. They are significantly less likely to be aiming just to pass. Group 1 (EASY) students are significantly less likely to be enjoying the module; do not think they will be able to apply what they have learned in the future; and have least interest in the subject. Students for whom the module is compulsory (Group 3) are significantly more likely than either of the other two groups to 'just want to pass'.

Summary

One of the implications of modular structures is that there is likely to be a wide variety of students taking the same module. This study has shown that students will have varying motivations for taking the module and will emphasise different outcomes. There was evidence that a large number of students were considering the strategic fit of modules with each other and their applicability to their future career plans. The fun element of learning was also considered to be important by many students.

A clear distinction could be made between students who chose out of interest in the subject, students who had no choice and those who chose a module because they thought that it would be easy. Students who chose out of interest were more likely to enjoy the module, did more independent study and tended to adopt a deep approach to learning.

Statement	Mean				Significance
	Sample Mean	Group 1 EASY	Group 2 INTEREST	Group 3 CORE	
I have learned a lot of things I didn't know before	3.9	3.6	4.1	3.8	0.15
I think I will be able to apply what I've learned in the future	3.9	3.4	4.4	3.6	0.00***
I am really enjoying the module	2.9	2.4	3.4	2.6	0.00***
I just want to pass	3.1	3.0	2.7	3.6	0.03**
I am really interested in the subject	3.2	2.4	3.9	2.8	0.00***
I want to gain as high a mark as possible	4.4	4.1	4.7	4.4	0.00***
It is much more difficult than I expected	3.7	3.5	3.9	3.6	0.32
I always do all the recommended exercises and readings	2.7	2.6	3.0	2.5	0.18

Table 9: Students' Attitudes towards 'Introduction to Finance'

Students who chose the module on the basis of how easy they expected it to be enjoyed it less, studied less and tended to focus just on passing. Where the module was compulsory, students also enjoyed it less and focused just on passing the assessment. Clearly this creates problems for the lecturer who has to teach one group of students with very diverse motives. In this particular instance, 40% of the group had chosen the module out of interest and the remaining 60% (of those who were interested enough to attend the lecture) were there because it was compulsory or they had hoped it would be easy. Therefore, if the lecturer designed the module to suit the objectives of the interested group of students, the objectives of the majority would be ignored. However, if the module only aims to satisfy students' objectives to pass the assessment, whatever form it takes, it raises serious concerns about the educational content.

Implications and Recommendations

This study has implications for departments in their selection of core modules for particular degrees. Often there are very sound reasons why students are required to take a module outside their main subject area. In this case, engineering students are required to take a finance module because they need to understand the financial implications of engineering projects. However, many of them show little interest in the subject, tending to have a surface approach to study, which leads to very little long term recall or understanding of a subject. As students have been clearly shown to take into account the fit between modules and applicability to their future career, it might be better for such modules to be recommended but not made compulsory.

This study also has interesting implications for lecturers. Many lecturers are well aware that not all students are as interested in their subject as they are. This is made apparent by questions such as 'If I just learn this bit, will I be ok?' or 'Do I need to read the book you recommended?' However, this study has shown that a large number of students are interested in the subjects they study; they want to learn more and they find studying enjoyable. Lecturers should be encouraged by this and consider ways to increase the proportion of their student group which fall into the 'interested' category. Students are more likely to be interested when they can see the relevance of a module to other areas of study and to their future career. However, lecturers cannot ignore the existence of students with alternative motivations. If students with a surface approach to learning dominate, it can lower the aspirations of the whole group. Deep learning can be promoted for all types of students, regardless of their original motivation for taking the module, by increasing student involvement, providing choice within the module and changing the method of assessment away from an examination focus. For example, in this case, the assessment could be changed from 100% closed book examination to include a project where students choose the topic studied and/or the examination could be made open book.

Students and student advisers should consider the significance of choosing modules out of interest rather than other reasons. Students who choose out of interest will learn more, enjoy more and as a bonus they may also get higher grades because they will have a better understanding of the subject.

Educational researchers should be aware that this is an area with potential for a lot more research before the interactions are fully understood. Further quantitative research is required to ascertain the extent to which this group of students is typical of those undertaking introductory modules. However, one of the limitations of surveys, particularly cross-sectional studies, is that relationships can be identified and they can help corroborate hypotheses but, because data is gathered at one point in time, they cannot, without further evidence, clinch a causal argument (Marsh 1982). In this paper, a link between learning styles and reasons for choice of modules has been identified but causality has not been established. Qualitative research, with its emphasis on meaning rather than frequencies (Easterby Smith *et al*. 1991), is required to examine the interaction between influences. Longitudinal case studies would be particularly useful in establishing the circumstances under which learning styles and reasons for choices change over time.

For example, the link between assessment procedures and students' approaches to learning is fairly well established (Entwistle 1998). However, many of the studies are cross-sectional analyses which can only indicate a correlation, they cannot establish the direction of causality. The more usual argument is that assessment 100% by examination encourages a surface approach to learning. However, students who tend towards a surface approach may choose modules because they are 100% exam, thus reinforcing their preferred learning style.

Alternatively, students with an 'achieving' orientation may be motivated more by getting the qualification than by learning *per se*. They are expected to choose modules that play to their strengths and/or make it easier to qualify. It was also suggested that these students might change their preferred learning style to suit the module. Such cases require longitudinal research to track cause and effect.

As educators, we should be looking at ways of actively developing the quality of students' learning (Race, 1995). This study has shown that students' motivations for module choices influence their learning experience but further research is required before it is fully understood.

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