Experiential Capital of mature returners to Engineering Education.

Effect of entry qualification types and grades, motivation and expectancy on progression. Industry based students on an accelerated BEng Manufacturing programme. M.Eason.

1. Change in Education, inputs and outcomes.

Is there a correlation between prior educational study results and progression at degree level? Does work based experiential learning aid in the further studies of the students? (1) What if any are the perceived factors in the transitional and ongoing pathway for standard entry Student's compared to work based returners? Does experiential capital play a role in achievement?

2. Changes in mature student's entry profile %, by age, year and subject

The age profile of mature, 21+ students has in general changed over time between 1980 and 2018 whilst there has been a 16 fold increase in student numbers and 10 fold for Engineering . There was an increase in 21-24 but a decrease in older students whereas for Engineering there was a decrease in 21-24 but significant increases in 25-29 and 30+ (2). So are we getting an increase of "experiential capital "?

The changes in the 14-19 curriculum and the balance between depth and breadth in first degrees has been reported, as have the trends in entry qualifications for STEM related courses. The importance to the economy of such graduates is accepted along with the need for basic generic skills valuable to future employment in many reports. (3) The influences on programme and career choice for students are extensive along with an expanding range of entry qualification types, the impact of these would benefit from further research. In a comparison of academic experiences and achievement (5) the analysis revealed a marginal disadvantage in academic performance for students entering via non-traditional enabling programmes, but a positive effect for mature age on entry.

3. Entry grades qualification type and academic performance.

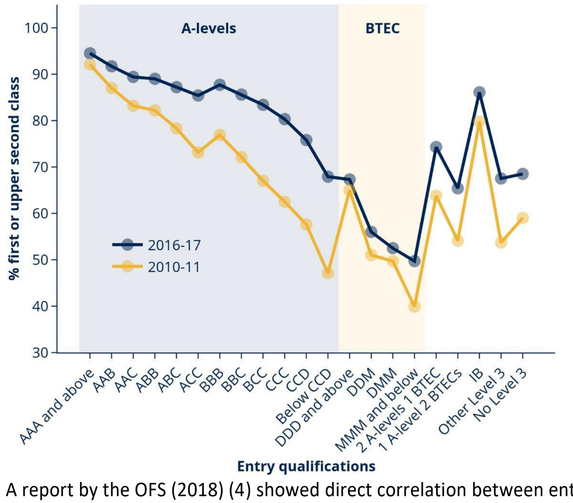


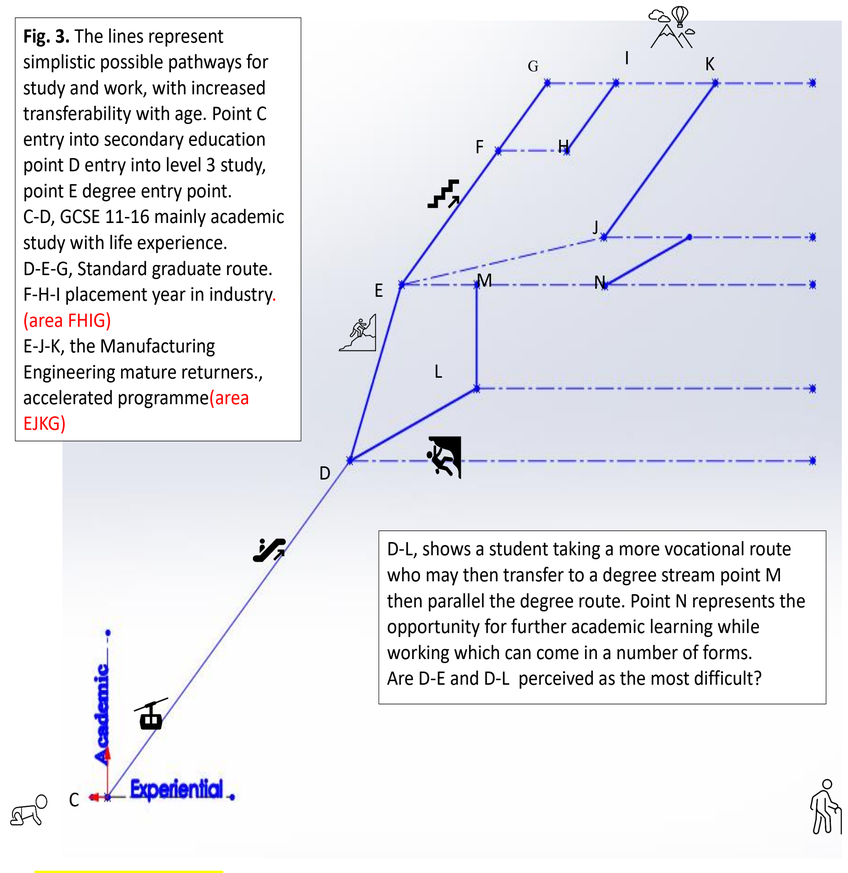
Fig. 1. A report by the OFS (2018) (4) showed direct correlation between entry grades and Degree classification with some comparisons between "A" levels and other qualifications. The picture is more complex than this though with a wide range of qualifications and modes of study. The literature contained mixed messages on the impact of entry level qualifications and graduate outcomes.

4. Progression difficulties related to qualification type.

Research by the author on year 1 progression for engineering students against qualification type indicated that BTech. entry showed a significantly higher percentage of progression problems and that "A" and "AS" split evenly. There were no problems for industry based students and the significant positive for HND entry is to be expected.

5. Pathways through Academic and Experiential learning, barriers or open roads?

Fig. 3. The lines represent simplistic possible pathways for study and work, with increased transferability with age. Point C entry into secondary education point D entry into level 3 study, point E degree entry point.
C-D, GCSE 11-16 mainly academic study with life experience.
D-E-G, Standard graduate route.
F-H-I placement year in industry. (area FHIG)
E-J-K, the Manufacturing Engineering mature returners., accelerated programme(area EJKG)



D-L, shows a student taking a more vocational route who may then transfer to a degree stream point M then parallel the degree route. Point N represents the opportunity for further academic learning while working which can come in a number of forms.
Are D-E and D-L perceived as the most difficult?

"Experiential capital" Area FHIG represents linking directed work experience with academic study and covers placement students, giving us a 2.8% gain for this (6). Area EJKG covers a greater period and a more intense directly related experiential advantage and could be linked to the 10% difference from the authors research on Manufacturing returners. The key point is that in these cases the experiential and academic activities are coherent, whereas other routes may advance in either form but are not necessarily coherent.

6. Range of qualifications on entry.

Entry qualification examples.	Manuf %	Standard %
A/AS level	6.3	7.0
Certificate at level 3 (BTEC)	9.5	3.0
Diploma at level 3 (BTEC)	9.5	7.4
Foundation Degree e.g. FdA, FdSci	7.4	7.1
Higher National Certificate (HNC)	25.3	2.4
Total students. Manufacturing/ Standard entry	95	862
Total qualification type	17	35

Table 2. The range of entry qualification types for Wolverhampton industry based Manufacturing Engineers and standard entry show there was little significant difference in percentage of entry qualification types between the groups, apart from the level of HNCs. It could therefore be assumed that this should not have a major impact on grade achievement and progression. What should be noted are the total types of qualification on entry, 17 and 35 and the potential impact of these on early progression.

7. Achievement.

A study of 5 years of the mature entry Manufacturing programme showed significantly higher overall grade performance and a snapshot of their closest match, conventional Mechanical Engineering students show a difference of 10% in overall grade performance at graduation. (6) Experiential capital.

8. Motivation and expectancy.

Research into motivation in learning is extensive and a number of researchers have looked specifically at Engineering and mature returners. (7). Experiential learning was a common concept that came up with the adult students studied, along with the concept of self-directed learning among adult students.

A further study (8) using Factor Analysis revealed three categories of values (interest, attainment, and career utility).

9. Pilot study.

A pilot study by the author used a questionnaire to assess the entry grades, progression and motivations of a group of mature learners to the BEng Manufacturing degree to ascertain possible reasons for the 10% difference in overall achievement . Question groupings are shown below.

1-23 Subjects studied, grades achieved, reasons for choice, practical aspects. 24-38 Transition and work. 39-63 Expectancy. 65- 93 Challenges. 94-105 Future plans and study.

10. Initial statistical results and free text feedback.

Initial results showed a range of 21 subjects studied at GCSE and 13 at Advanced level with NVQ, A level, BTech and HNC all represented.

It was felt that secondary level teaching was primarily factual with less support in terms of practical working at both levels. Transition to HE was generally seen as not being a problem.

The main expectancy themes came around getting a degree, personal achievement and career progression.

The most significant concern was time away from work, whereas capability and relearning material was not a problem.

The ability to contextualise work and study "experiential capital" would seem to be a strong advocate for their increased academic achievement.

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