Decision-making in transitioning from a STEM degree
The role of Science Ego and emotional geography

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(Very quick) Context

- Massification and marketisation of HE – erosion of the public good (Naidoo and Williams, 2014)

- More people going to university implies the degree is not enough (Tomlinson, 2016) – but are only certain people accessing "better" education/jobs (Brown et al. 2014)?

- Individualisation of employability and peoples futures (Boden and Nedeva, 2010)

- Changes in demands have transformed some cities into 'studentified' locations (Smith 2005, Nakazawa, 2017), which are changes in urban spaces to respond to the movement of highly mobile, temporary student populations to access HE.

- To add to this: Uncertainty brought on by COVID-19
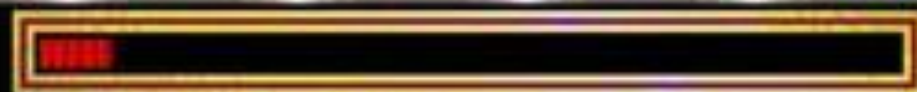
Study

Focus: The ways in which physics students *'make their way through'* their degree programme and eventually transition into their career futures.

Evaluative study of how the employability agenda is engaged with, alongside an interest in young people's decisions about their futures (agency)

Longitudinal, in-depth interviews with 8 participants over 14 months

Use of 'stories' and narratives of transitions through and from university into career futures.

Collecting stories

Move away from Human Capital Theory and the use of Pierre Bourdieu's popularised concepts like the Forms of Capital, often used contrary to its intended meaning.

Intended to balance structure-agency-culture. Margaret Archer's (2003, 2007, 2012) notion of Internal Conversations to make sense of decision-making. Critical Realism, Reflexivity in late modernity, processual social behaviour.

Internal Conversations

| Concerns | Projects | Practice |

Stories

Participant	Career plan at university End semester 1	Career plan at university End Semester 2	Activity/employment on graduating	Status 6 months post-graduation
Tony	ICT – interested in graduate scheme, applied for teaching scheme via career module	Undecided; not looking at jobs, but plans to attend career fair in April	Got a job via friend's father's friend through happenchance meeting at a tea house	Working on said job – big data SME
Isaac	Arms and ammunition, robotics – Applying to graduate schemes	Got a graduate scheme offer – accepted in intended industry	6 week research placement at Yorkshire Urban university	Graduate scheme accepted before Meeting 2
Alice	Travel, Finance-related consultancy work, teaching	Ski season, and same as Meeting 1	Temp accounting work at local council to save up: job via mother	Ski season trip (unable to speak as a result)
Jane	Academia, applying for Masters	Accepted onto Masters, but unsure of uptake; thinking about physics in health sector	Temp. Summer Administration job at local pool	Temporary work at hospital; looking into health-related Masters course

Stories

Participant	Career plan at university End semester 1	Career plan at university End Semester 2	Activity/employment on graduating	Status 6 months post-graduation
Ash	Banking/Finance – Applying for graduate schemes, attending interviews and tests	Got a graduate scheme offer – accepted (Cyber security in finance)	Travel, move location, begin graduate scheme	Graduate scheme accepted before Meeting 2
George	Academia – applying for Masters	Academia, accepted on Masters	Masters	Masters (thinking about PhD, but eventually does not do one as it does not work out)
Louise	Finance – Applying for graduate schemes - interviewing	Did not get graduate schemes; sent CV to an accounting firm via family	Applied for jobs via recruitment agency: working at an SME	Changing jobs to a bigger company for improved growth
Zachery	Academia – Masters in Engineering, work to save up for PhD in Physics	Plan to do a summer internship	Could not do internship b/c visa. Delay in visa for Masters	Masters, applying for defence engineering & finance graduate schemes

Main findings and points of discussion

(1) Rather than the formal routes of employability development, young people's decisions are influenced by the complex interplay of personal and structural aspects beyond financial exchange-value of a degree (what is developed in the thesis as 'graduate sense of self').

(2) There is a uniqueness not just in STEM, but Physics specifically, in relation to (thinking about and subsequently) getting *any* job, which can be understood through the concept of 'Science Ego' which enables physicists to transition to their futures with a certain sense of confidence.

(3) It is imperative for discussions on job and career futures to pay careful attention to the impact of geography on transitioning from a degree.

# Science Ego

The person and science in society

Science Identity (Vincent-Ruz and Schunn, 2018)

[T]hree conceptualizations for what drives science identity: (1) a sense of community and affiliation (Carlone and Johnson 2007); (2) built by consistent extrinsic and intrinsic attitudinal factors (Aschbacher et al. 2010); (3) a match between school science and real science (Archer et al. 2010).

Science Capital (Archer et al., 2015)

"science capital" is not a separate "type" of capital but rather a conceptual device for collating various types of economic, social and cultural capital that specifically relate to science—notably those which have the potential to generate use or exchange value for individuals or groups to support and enhance their attainment, engagement and/or participation in science.
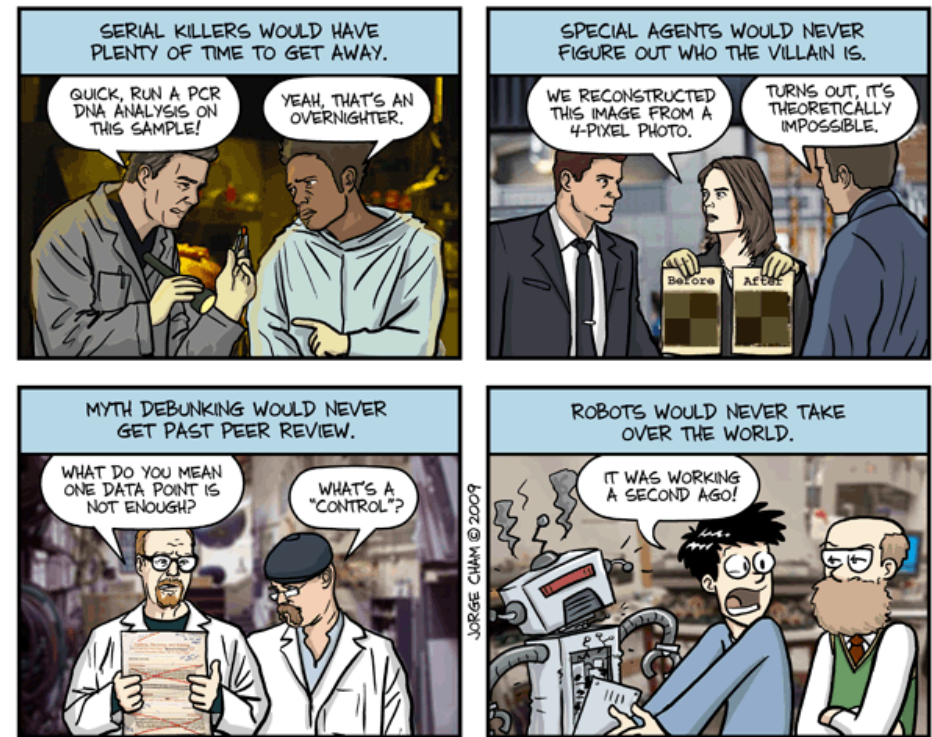
Stories

Jane: I think I'm very lucky to have great parents. My dad likes to hear about physics as well. They're just very interested. Even my sisters, they're always like "Oh Jane's the clever one, she does Maths" and I'm like [giggles] I get embarrassed and stuff. I dunno, yeah. They're just really supportive. My mum gets really excited about my future career and she starts like looking up jobs for me and things. I'm like stop. [laughs] [Interview 1]

Louise: It's how you know to get to that, learning to create links which is more beneficial. I get a lot of people "oh why'd you study physics" and I'm like "because I really enjoy it". I didn't want to waste my time [on a business degree]. [Interview 3]

Stories

Tony: from what I've gathered the opportunities are... it's got more opportunities than a lot of degrees I think. Which is probably why I have taken the arrogant stance that I have and don't really have to have an option at the moment and haven't applied anywhere, but I think that hasn't impacted it just because I can see- just because there are so many options available I haven't made quite so much effort [as] if I was on a.. Don't want to be rude, but a less employable degree.

Me: What's a... Please don't feel you- I'm not going to be offended.

Tony: I don't know what your degree is in

Me: Good.

Tony: Well, I mean stereotypically its things like humanities [...] If it's what you want to do its fine but your employability options are more limited than something like Physics I think. [Interview 1]

How is Science Ego different?

Higher Education is now massified and thus the trajectories from the same are bound to be different, and not always towards a 'science' job.

Concept and uptake		Time and progression from education to work					
		School	A-levels	University	Further Education	Job	Career
Science Identity	C*	■	■	■	■	▨	■
	E*	■	■	■			▨
Science capital	C	■	■	■	■	▨	▨
	E	■	■	■			
* C = Continued with science; E= Exited science (even if temporarily)							

The argument of Science Ego

Young people do not always construct their futures in terms of an exchange.

Instead, science ego is a combination, in part, of science capital and science identity once they are mobilised beyond education or science-related work.

Going further and in keeping with the theoretical framework, the science ego is also one which acknowledges the role of the structure in this process of decision-making. It requires that:

- *External, structural cues be incorporated into thought process; and*
- *Internal views be authenticated via outside structures.*

(D'Silva, 2019: pg. 155)

Emotional Geography

Deciding on a university

University Ranking system and reputation of selected institution

Whether the subject is offered in the way the student hopes to learn it – for example one participant wanted to undertake a joint honours programme, and this institution was the only one that offered it in a comprehensive and structured way

It not being a polytechnic – as students were more interested in theoretical aspects. However, this also relates to (class and regional) biases (Moreau & Leathwood, 2006)

Geography of the institution including location and structure of campus – some campuses spread across cities – and facilities offered on campus and in the department.

An aim to seek enjoyment and revelry, creating what Chatterton (1999) called "exclusive geographies" structured to cater to the large number of students moving to study

Transitioning to Career Futures

Chart 5 - UK domiciled higher education leavers in work in the UK by region of domicile, region of HE provider and region of employment 2015/16

Region of domicile — Region of HE provider — Region of employment

Yorkshire & The Humber

Rest of the UK
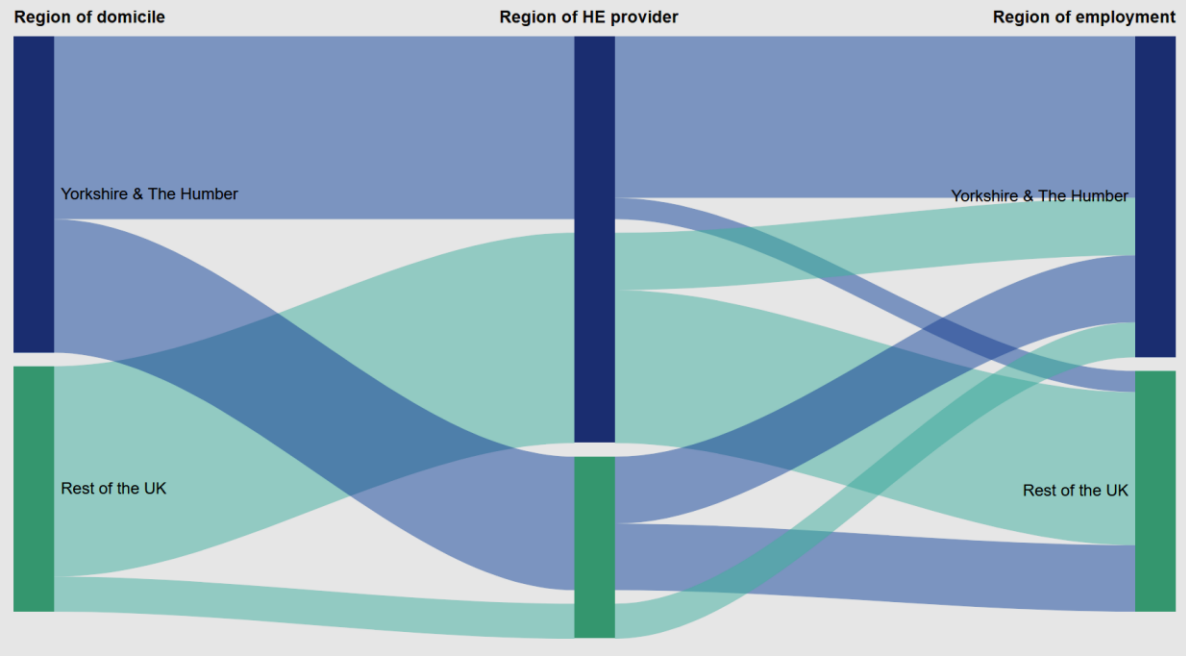
Participant	Home and movement prior to university	Movement from university
Tony	East Anglia (Rural)	Home
Isaac	North Yorkshire	Greater Manchester
Alice	East England	Home, travel, return home to work in London
Jane	South Coast	Home
Ash	Southern Europe; East Yorkshire (rural); West Yorkshire (urban); return to East Yorkshire (rural)	London
George	East Midlands	Scotland
Louise	East London	Home
Zachery	North Africa; Persian Gulf	Greater Manchester

Stories

Tony, South East England, Rural/Countryside, 'affluent, middle class' area

Tony: … There's always somewhere you can go out and go do something and people are always going out and being busy. […] It's interesting just having all those options available for things to do. But then it is quite… I don't know. I enjoy the quiet. I don't know if that's because I've been brought up in the countryside but I do enjoy peace and quiet which you don't get here.

Me: Has it had an impact on how you see things?

Tony: I've decided I don't want to live in a city after my degree. I'm enjoying living in it now, but I don't think I can see myself spending my life somewhere in the main city like this or at least living in the middle of it. [Interview 1]

Stories

Ash, North East England, Rural, 'deprived' area

Ash: Another reason I moved down to London is to explore the area looking at, you know, the city and go out, you know, go outside and wander round and get lost and explore. [..] and just enjoying being in a new city, calling it home, I guess.

Me: What would have been different if you were back home?

Ash: Oh my. That is not a good thing to think about. Well there's nothing in my home town so [laughs] I wouldn't have been able to get a very good job. I'd have just been probably quite demotivated and I don't know, not particularly enjoying work. Oh, I probably wouldn't have been looking forward to the next six months if that makes sense. [Interview 3]

Emotional relationships with place

'Emotional' sits in contrast to the positivistic notions attached to getting a job.

It was also linked to mental health, ease of getting a job, proximity to 'home' location.

The university as a space and place is influenced by and influences those who interact with it. Thus, mobility, independence & lifestyle become important aspects for people as they function within the heterotopic university and transition from it.
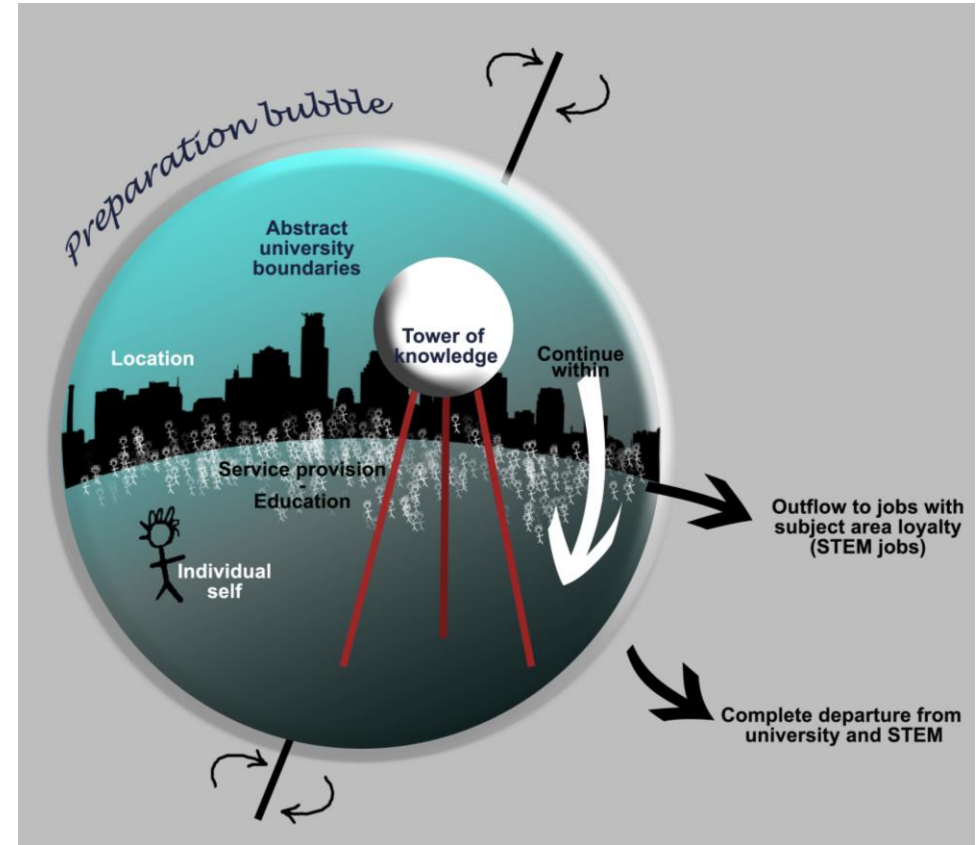
Implications and suggestions for change

Working with civil society groups, local governments and student groups, identify appropriate ways in which students can learn about the places to which they move.

An explicit consideration of the expectations of employers.

Inclusion of young people from diverse backgrounds (class & protected characteristics) on panels discussing HE policy.

Abolish tuition fees as they serve to hinder people from accessing HE.

Career services may be able to mobilise the use of the notion of the 'science ego', and must also consider people's attachment to geography in supporting job-seeking or career development.

Most participants felt they had a professional yet personal relationship with their tutors which helped them gain confidence. Staff should receive additional help to best support students including a significant amount of time set aside for the task and continuing professional development.

More and better mental health support for students and also extended to staff.

Thank you!

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