

Breaking the mould: Girls' experiences of studying engineering at University Technical Colleges

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Background- women in engineering

- UK has a shortage of engineers (Harrison, 2012)
- Important for economic growth
- Women are under-represented in engineering
- Gender pay gap (Olsen *et al*, 2012)

- Pipeline
- Education->Labour market (women leak at various points)
- Girls are less likely to study engineering
- University Technical Colleges (UTCs) with an engineering specialism is one route

What Are University Technical Colleges?

- 14-19 schools, independent from local authority control yet in receipt of state funding through the **Academies programme**.
- Sponsored by **Local College, University, Industrial Partner**: All involved in designing the Curriculum.
- Each UTC has a **specific technical focus** related to **local industry needs**, industry sponsors and university's areas of excellence.
- **Diploma, GCSEs** and **bridging skills** (Business, enterprise, etc.).
Many enrichment opportunities (arts, languages, national competitions).

University Technical Colleges

Provide high quality *technical* education and training.

Develop *enterprise* and *employability* skills.

Clear *progression* pathways to Further and Higher Education.

Developed by **Baker Dearing Trust**.

Five UTCs currently open.
12 opening September 2013.
15 further approved applications.

www.cerp.org.uk

"The next great poverty-busting structural change we need – the expansion of University Technical Schools – offering first-class technical skills to those turned off by purely academic study."

David Cameron
Prime Minister



From: <http://www.utcolleges.org/>



University
Technical
Colleges





Teaching & Learning

- **Longer working day:** 8.30am – 5pm (*Amended not every day*).
- **40-week school year** split into 5 terms (one week on work placement).
- **Staff:** Team Leader/Teacher and several learning mentors.
- **KS4 Curriculum Split:** Core General Education: 60%, Technical Education: 40%
- **Integrated curriculum** to make learning “*real and relevant*” based around Diploma

Project to design a pump for a jet engine – all lessons will relate to this.

“German for engineering, not Goethe” – Kenneth Baker

Rationale

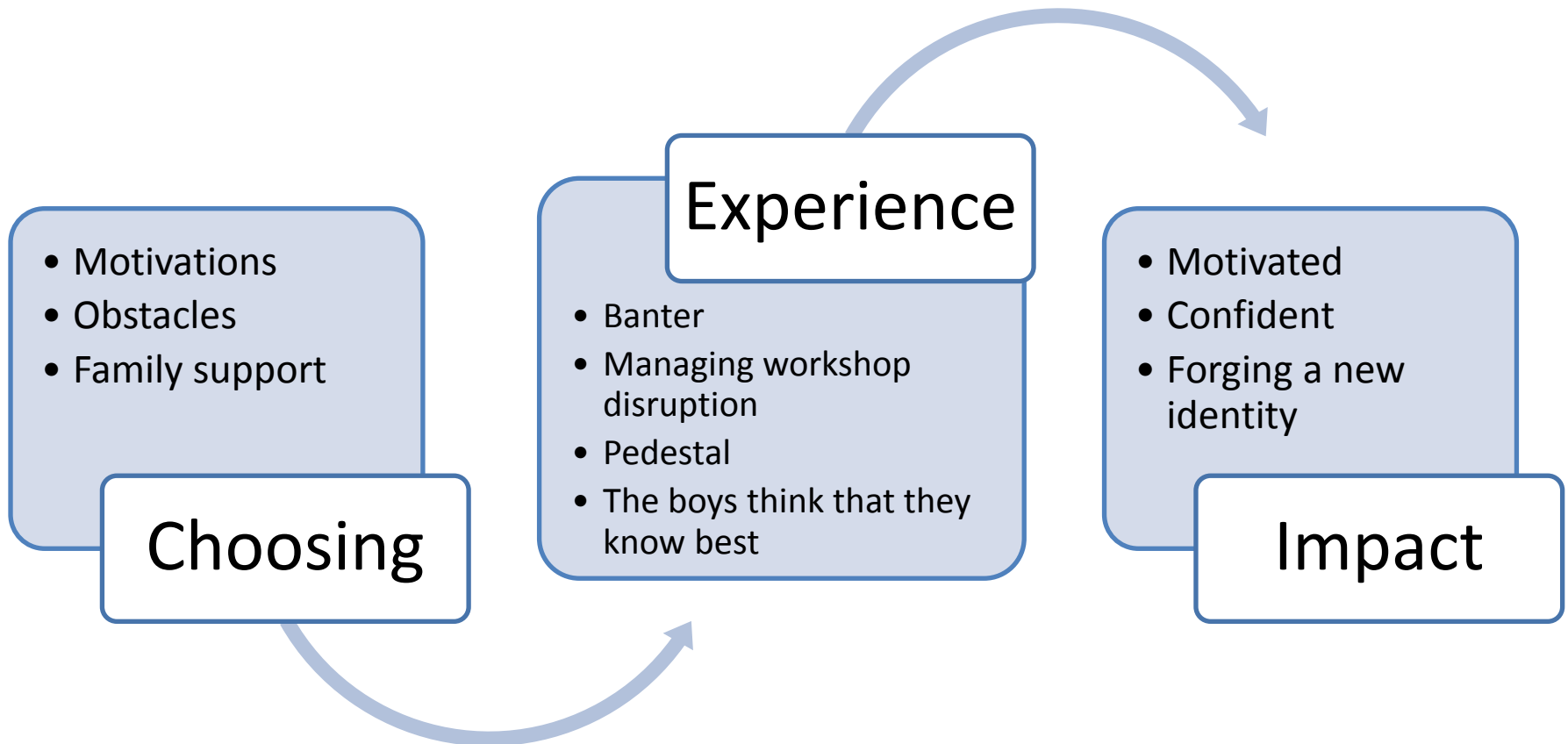
- Very little research examining UTCs
- Earlier work has drawn on a predominantly male sample, reflecting the UTC intake
- The present paper focuses on the female students
- What motivates girls to move to an engineering UTC?
- Explore their day-to-day experiences of studying at a UTC
- Case study of girls studying engineering within a new educational environment

Focus groups with UTC students

- 3 female only focus groups
- 2 groups in Year 10
- 1 group in Year 11
- 19 female students (n= 5, 5, 9)
- Whole cohort
- 2 UTCs

- Semi-structured schedule
- Non-leading questions

Findings



Choosing

Motivations

- Engineering
- Non-engineering specialism
- Fresh start

Obstacles

- You don't fit the mould
- Girls can't be engineers

- However, family support was strong

Motivations: Specialisms

- Engineering

“I’ve liked engineering all my life...I used to build little motorcycles out of model kits. I’ve always liked them.”
(Year 10 student)

- Business

“I came here thinking I’m going to be brilliant at business. I like all the written stuff. Came here and I’m like ‘no, I like drawing and I like the hands-on bit’.” (Year 10 student)

Motivations: Fresh start

- Better support for dyslexia

“My Mum wanted me to come because I personally struggle with dyslexia and here we’ve got quite a good like ...support.” (Year 10 student)

- Previously disruptive

“I’ve been behaving myself more so like I used to be quite annoying, I used to have like loads of fights and loads of arguments but now I’ve just calmed down and like behaving myself, getting my work done.” (Year 10 student)

Obstacles: You don't fit the mould

*“My friend, when she found out that I went here, she went ‘oh so you’ve got your pick of the lads then?’”
(Year 11 student)*

*“You either get called like a slut or a slag or you get called a butch lesbian for fitting in with the lads.”
(Year 10 student)*

Obstacles: Girls can't be engineers

“Female 1 – He wrote on the UTC Facebook page and put ‘girls can't be engineers’ and then tagged Amy in it.

Female 2 – Yes. It was sort of like a running joke it was classed as like a school for boys so there was a lot of sexist comments and a lot of like ‘girls can't be engineers’ and things.” (Year 11 students)

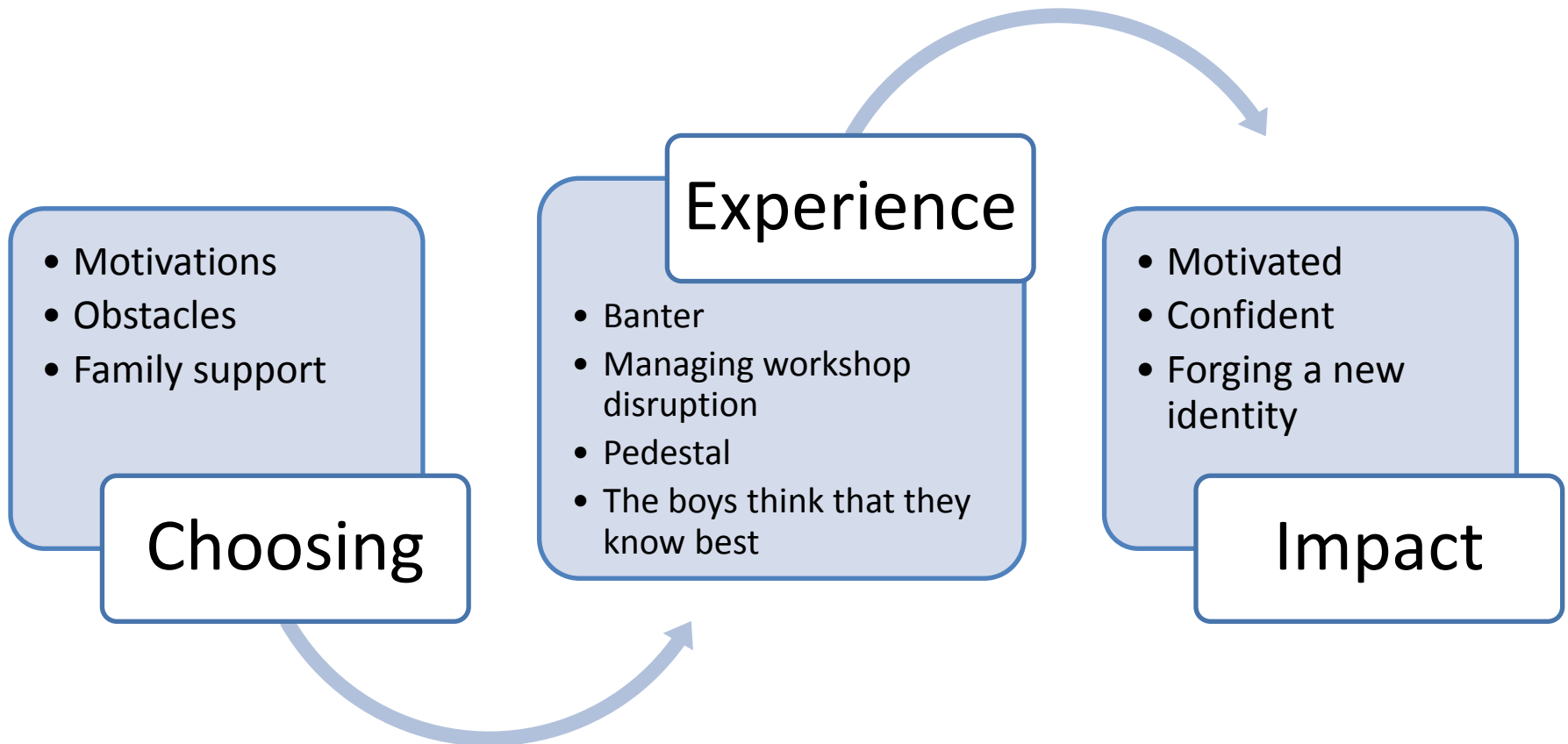
“When I told all my friends at my old school that I'm leaving, they were like ‘why are you coming here? It's a boy's thing’, they said ‘women aren't doing it, there's no female engineers’ but I wanted to do it because it's something new and something fresh that I wanted to join it.” (Year 10 student)

Supportive family

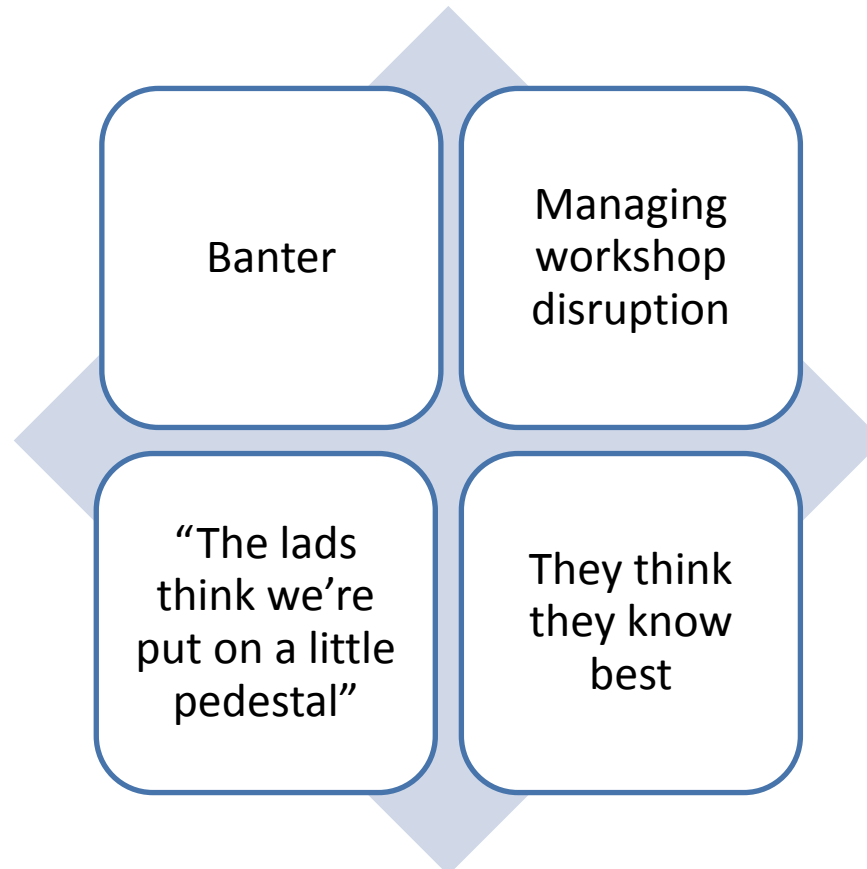
“My Mum’s been with me all the way ..., and my Dad, encourage it. They were a bit nervous at the start because they didn’t know if I would like it or not.” (Year 10 student)

“My parents were completely behind my decision. They knew I wasn’t happy at my old school and I was going to move anyway so why not?” (Year 11 student)

Findings



Experience: Adapting to a laddish culture



Banter

- Safe Banter

“Female 1– There’s so much banter.

Female 2– The school kind of like encourage banter though don’t they?

Female 3– Yeah they do.

Female 4– Like rather than arguments and things it’s more like just to have banter in lessons. It’s just a laugh really.” (Year 10 students)

- “Lethal Banter”

“You have to have an incredibly thick skin to not break down crying every 5 minutes. Like I mean I remember at the beginning I was quite a wuss to be honest but as it’s gone on I’m kind of like as the term’s gone on, I’ve been here about a year and a half now and it’s like if someone says something I’ll either bite back or you just like ‘whatever’.” (Year 11 student)

“The girls are on a pedestal”

“Female 1 – The boys had to have this talk on like how to treat the girls and it all like kicked off because ...

Female 2- It escalated to not good things.

Female 3– Because they had a meeting.

Female 1– Now they keep calling teachers sexist because like they’re being nice to us.” (Year 10 students)

“They’re always saying ‘oh the girls are put on the pedestal’” (Year 11 student)

“They do say things like ‘it’s because you’re a girl you got that mark’, you’re thinking ‘no, it’s because I got more right’ at the end of the day but that’s the thing that they do say here a lot.” (Year 11 student)

Managing workshop disruption

“I think because there are so many lads, it’s almost just like it’s a playground or something; they just mess around all the time...”

We’re kind of put in like to try and control some of the lads sometimes as well like in the challenge groups we’re put in like we’re seen as like leaders and we’ve got to try and sort them out a bit.” (Year 11 student)

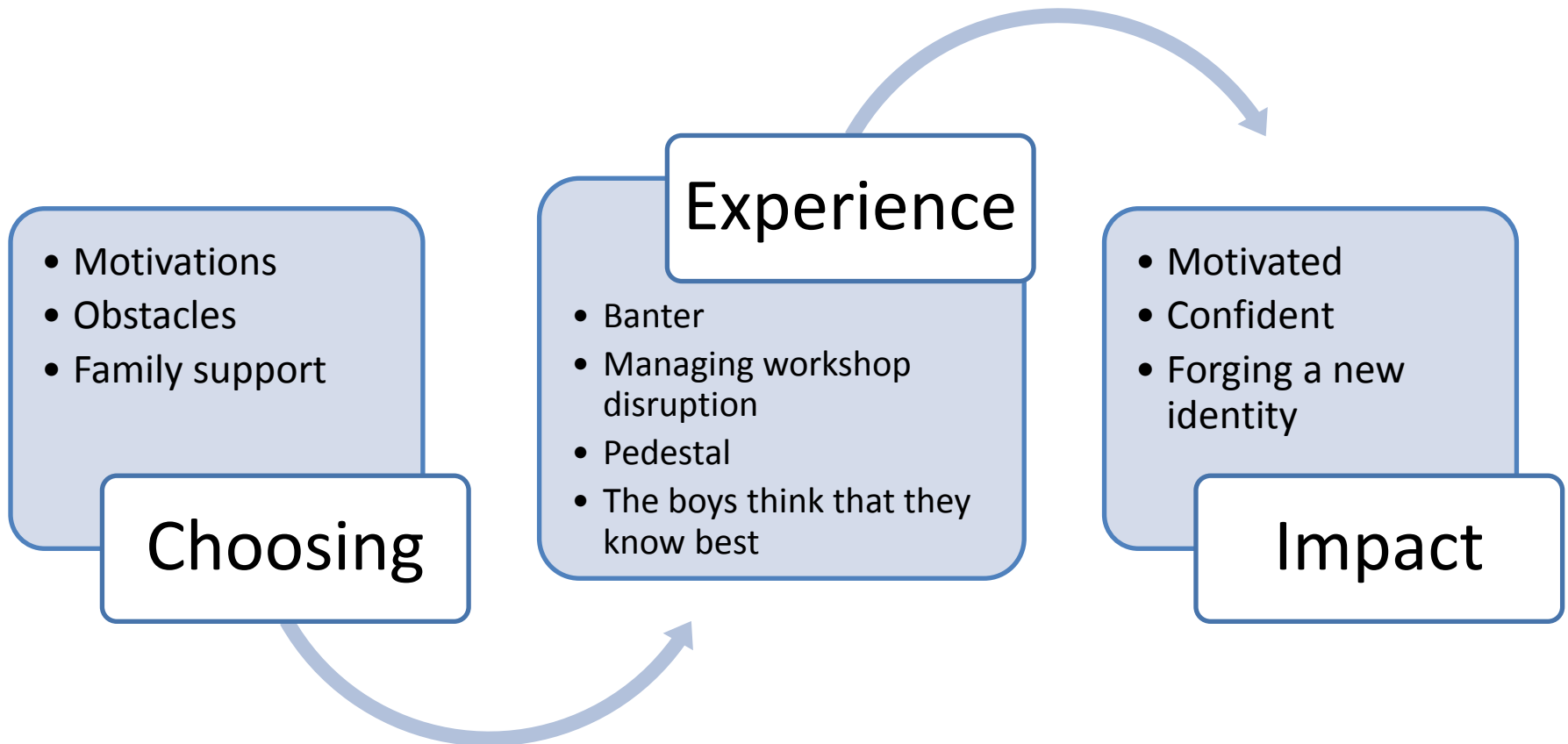
“Miss James put me in charge because Jason was doing a rubbish job of it and so we didn’t have anything for the first couple of months, so she put me in charge...” (Year 10 student)

Boys think they know best

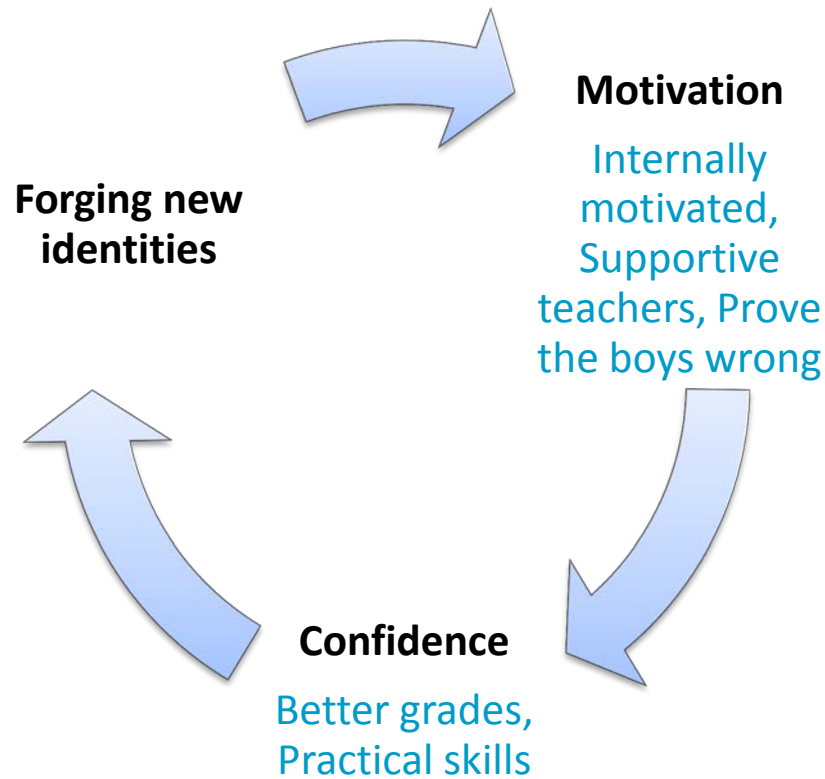
“Sometimes as well a boy thinks they know best so if you ... even if you know, like for the Challenge, even if you know how to fix the car or put it together, you can’t possibly do that because you’re a girl.” (Year 10 student)

“Like if someone wants to win and if they know the idea’s a good idea they’ll admit that the girls have got a good idea and they’ll do it” (Year 11 student)

Findings



Impact



Impact: Increased motivation

Internal motivation

*“Female 1– I think girls sometimes have higher self-expectations (than the boys).
Female 2– Yes, definitely.” (Year 11 students)*

Supportive Teachers

*“I didn’t really care about it [work at previous school] to be honest because the teachers [at previous school] really didn’t care either so I didn’t care either ...”
(Year 10 student)*

Prove the boys wrong

“Female 1 – I wouldn’t say I try and compete but I like to shut them up because they always say like ‘oh you’re a girl, you’re obviously going to be better at this stuff’ and actually they say it in a way that it’s almost ..., they’re trying to put you down and I’d just like to shut them up. I’m not competing with them I’m just trying to tell them to shut up and get on with their own work. That’s the way I see it.

Female 2 – It sort of makes you go a bit further.” (Year 11 students)

Impact: Confidence through competence

“Before in my old school I would have been aiming for like ‘C’s, ‘B’s, now I’m aiming for ‘A’s so it does improve it a lot more” (Year 11 student)*

*“Female 1– When it starts to like make a funny noise and you're like 'oh my god!'.
Female 2– It's because the boys showed me all these pictures of people with their arms missing and their face missing and it was just like 'what if that happens to me?' so I didn't like the fact that the boys were showing me all those pictures.”
(Year 10 students)*

“It (the machine) was loud but, you know, that's all it was, just loud. Unless you left the guard up, right, there's nothing to worry about.” (Year 10 student)

“We'd be confident to go and do it in the workplace and say we know how to do it (use machines).” (Year 11 student)

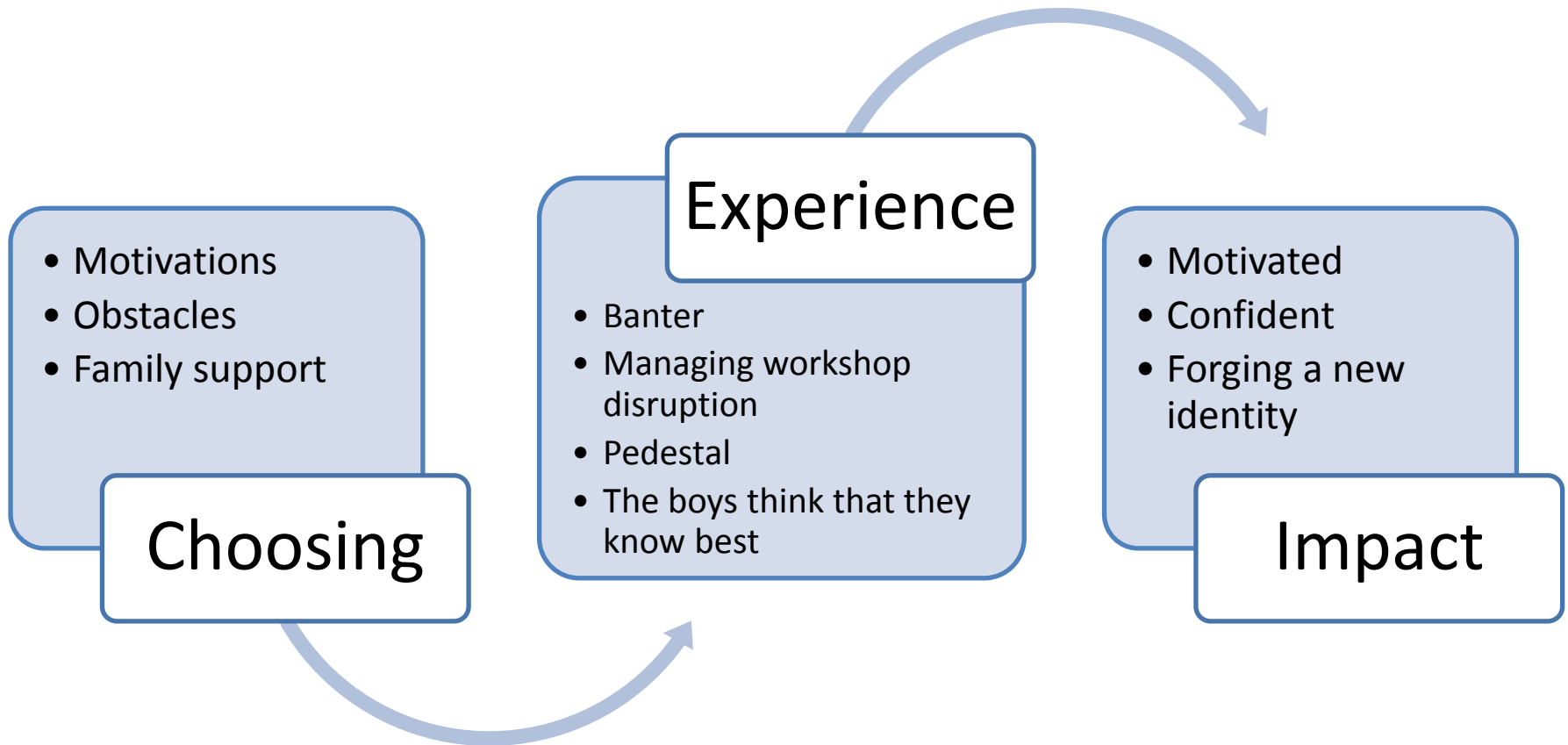
Impact: Forging a new identity

“Female 1- I wasn’t nervous but I’ve become a bit more cheeky while I’ve been here. Like I think you do have to like create a bit of a character to be honest like to stick up for yourself a bit and join in with, like we say, the banter, it’s like you have to like become that slightly cheeky person.

Female 2 - Yeah. I was very shy at the start of the year wasn’t I?” (Year 11 students)

“I was a bit of an attention seeker to be fair ... Maybe a little bit. And when I’m here, it’s just like, because there’s not many girls, you can’t..” (Year 10 student)

Findings



Encouraging girls to study engineering- student suggestions

- Raise the profile of engineering generally

“Female 1 – People don’t really like value it that much like think it’s kind of stupid job kind of thing.

*Female 2– They value their cars, they don’t value the people who’ve made them.”
(Year 10 students)*

- More information about engineering in schools

“I think they need to know about engineering from a younger age.” (Year 11 student)

- Incorporate more design

*“I think also they could bring in some more girly version of like the DT, you could also do some possible girly projects because, at my old school we did textiles which was also DT but that was a girlier thing and although boys did do it, girls were more attracted to it so they could like introduce a new subject like that ...”
(Year 10 student)*

Implications

- **UTC specialisms-** Dual routes expose more girls to engineering
- **Gender and occupational stereotypes-** Act as obstacles to entry into engineering UTCs
- **Laddish culture-** Off-putting to girls but might change if more girls attend UTCs
- **Dripping tap effect-** individually these may be relatively insignificant but cumulatively they can dissuade women from entering and staying in engineering (Falkner, 2009)

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