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*Published in:*

CHI 2018- W32 Maker Movements, Do-It-Yourself Cultures and Participatory Design: Implications for HCI Research

*Publication date:*

2018

*Document Version*

Publisher's PDF, also known as Version of record

[Link to publication in Discovery Research Portal](#)

*Citation for published version (APA):*

Milne, D. (2018). Making as a means to re-engage disengaged young people back into education: a case study. In *CHI 2018- W32 Maker Movements, Do-It-Yourself Cultures and Participatory Design: Implications for HCI Research* Association for Computing Machinery (ACM).

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# Making as a means to re-engage disengaged young people back into education: a case study

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Presented at the ACM CHI 2018 workshop: Maker Movements, Do-It-Yourself Cultures and Participatory

## **Abstract**

When a child or young person disengages from education they are at a significantly higher risk of becoming involved in delinquency, violence and substance use. [5] This can have long term detrimental effects on the individuals and their communities. This paper will discuss a case study in which maker culture was appropriated in an attempt to empower disengaged young people and encourage them to return to and better engage with their education. Both qualitative and quantitative data was collected in order to evaluate the role that maker culture values had on the young people studied. The results were impressive with a 75% rate of re-engagement based on sustained improvement in attendance and teacher testimonials regarding confidence and self-esteem. More studies are currently being conducted to further evaluate making as a method of re-engagement.

## **Author Keywords**

Maker culture; Disengaged; Re-engage; Education;

## **ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

## **Introduction**

Disengagement from education which leads to non attendance at school is something which happens often. 1.2% of students under the age of 16 were permanently excluded from school in England for the school year 2015/2016. The number of students who were temporarily removed from school increased to 8.5%. This equates to a total of 6635 permanent exclusions and 336, 815 temporary exclusions. The number of students who were temporarily excluded more than once was 164, 895 students. [2] Numbers appear to be slightly less in Scotland at approximately 2.8% of students excluded in total, although the data available is less detailed and less transparent. [3] Even so, these numbers are significant and illustrate a situation which if not dealt with appropriately may lead to delinquency, violence and substance use. [5] Therefore there is a demand for solutions to disengagement and preventative measures for targeting students who are at risk of disengaging. This paper considers how the values and visions associated with maker culture can be bestowed onto students using digital making. A study was conducted as part of a wider project called 'Old's Cool', which is an intergenerational programme aimed at re-engaging at risk youth back into education. The case study discussed in this paper details how the use of maker activities (3D printing, film making, screen printing, sculpting etc.) within the project added value to the programme and contributed to the successful re-engagement into education of 75% of the participants. Perhaps more important than the measured quantitative data though, was that by participating in making and maker culture, the young people were empowered and more convinced of the value of their

own ideas and abilities than they were before taking part in the project.

## **Making**

Making is a natural activity, everyone has the capacity to make with whatever resources they have. [8] With the rise of the DIY movement in the 1980s and development of the maker movement since 2005, it might be considered that there are two ways of thinking about makers, those with a small 'm' and those with a capital 'M'; the capital 'M' Makers, being those who identify as Makers and not those who incidentally make. i.e cooking

The vast benefits of making have been illustrated through projects and literature since 2005. [1,4,8] It has become something that people and organisations have been supporting. In Barack Obama's inaugural address he paid homage to makers, 'Rather it has been the risk-takers, the doers, the makers of things – some celebrated, but more often men and women obscure in their labor – who have carried us up the long rugged path towards prosperity and freedom.' [6] This exposure has been beneficial for the movement as it encouraged others to value the makers in society.

Maker culture affords the opportunity to affect change throughout society. 'The leaders of the Maker Movement echo the fervor of Steve Jobs, who saw in the personal computer not just the opportunity to start a company but also a force that would change the world.' [1] The benefits of making for necessity or for pleasure are numerous and can positively impact everyone who participates.

The Maker Movement encapsulates digital making and therefore advocates the use of tools such as 3D printers

and laser cutters. [1] These tools allow people to create high quality products, this itself, 'offers technological empowerment, providing economic, intellectual, and even a kind of spiritual liberation.' [4] When people are empowered in these ways they feel that they are capable of doing and achieving more. This increase in self-worth can lead to the feeling of fulfillment, which results in happier people. This empowerment can be extended to all types of making, as Papert [7] argues that as people become dependent on the knowledge of professionals they lose faith in their own ability and knowledge. If more people make, create and do, they will feel less dependent on professional authority and have more belief in what they themselves can and are capable of achieving.

### **Method**

The project discussed in this case study is, 'Old's Cool' which is an initiative funded by the Paul Hamlyn Foundation. Old's Cool is an intergenerational project, which is run by a charity, 'The Citadel Youth Centre'. The charity provides social, recreational and educational opportunities for children, young people and their families living in Leith, an area of economic deprivation in Edinburgh, Scotland. The Old's Cool project builds on the objectives of this charity, with a specific aim of targeting those who are likely to leave school without a positive destination in work, education or training. The project uses established relationships with local secondary schools and agencies for the elderly, to identify both 11-16 year olds who are at risk of disengaging from education and older participants, typically over 60s, who might benefit from intergenerational activity. A team of youth workers then spend 18 weeks working with the groups to facilitate intergenerational activities, 6 of the weeks are spent

working on a media project, which involves the use of digital technologies. So far the media element has included photography, filmmaking and 3D printing. The use of technology has helped to engage the young people and encourage them to communicate with the older participants who might be less confident in using these tools. The particular 18 week programme discussed in this paper is the one that used 3D printing sessions as the media element.

To evaluate the use of maker activities as part of this project, observations were made in the form of field notes and self-evaluation forms were completed by the participants. In addition to this, teacher testimonials were used to understand how the young people responded to traditional education before participation with the programme and attendance data was collected for the first 3 months after the programme was completed. This data was collated to form a case study.

The maker values appropriated for this project are those defined by Thomas [8]. She says that makers have the following traits; curiosity, playfulness, risk, responsibility, persistence, resourcefulness, generosity and optimism. The values targeted in this project will be responsibility, persistence, resourcefulness, generosity and optimism. These particular values were chosen as they can tangibly be traced to having a positive impact on engagement with education as well as future employment opportunities for the young people.

### **Observation**

This particular group consisted of 5 boys aged 11-16 and 5 men over 65 years old. Typically the groups for this project range from 5-12 young people and

the same number of older people. However, due to the group dynamics, 5 was an appropriate number for this group.

In the first week of the media element of the project, the participants were given a demonstration of an Ultimaker 2 3D printer. The material was inserted, a file was loaded and the print was started. The participants were able to feel the material and watch as the objects were printed. Since this first session was just for demonstration purposes a mini Ultimaker robot was printed. As the print continued the participants were engaged in a discussion about the technology and its future potential. Within this particular group there were 3 retired engineers who were able to talk in detail about how this could have helped prototype ideas while they were working. When the young people heard the man talking passionately about the technology they started asking questions. This was an immediate change in interactions as at the beginning of the session the young people were not interacting with the older participants.

A specific example of this was when one man explained that if the 3D printer could print in metal it would be possible to produce a part for a motorbike that was not possible using any other method of manufacturing. One of the young people who is interested in motorbikes understood the benefits of this particular part which led to longer, more meaningful conversation between the two of them. This was the start of a positive relationship and in later weeks the man brought in photographs of a motorbike he had once owned.

The sessions were not rigidly structured and instead were largely guided by the participants themselves. If they wanted to talk, pass around samples and

draw ideas together then that was what happened. This minimal structure approach further removed the sessions from feeling like a typical classroom and allowed for learning to occur in an unforced way. This allowed the participants to take responsibility for the sessions and learning experiences.

For one of the sessions, the participants were encouraged to pair up in groups of one young person and one older person. They were then each given a 3D printing pen and challenged to build a tower using only the pens and filament. When using the technology, despite its appearance as a craft tool, the older people were less confident and reluctant to take part. However, being in pairs meant that they were encouraged and supported by their younger partner. The younger people were enthused to teach the older people how to use the pens and did so with patience and empathy which was indicative of a growth in maturity and personal development for all of the young participants. This can be considered as a result of the responsibility they felt for helping their partner, their persistence in making sure their partner had a positive experience and their generosity and willingness to help others.

At another session a demonstration of CAD modelling was given. The participants were taken through how to create a 3D drawing and how to convert it into the correct file type. They were then shown and encouraged to operate the 3D printer for themselves.

When demonstrating on a laptop, one of the older people was very happy to share his knowledge with the group about his computer skills. He had been attending classes for older people to learn how to

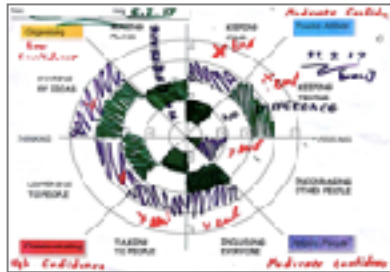


Figure 1 Self Evaluation Wheel

use computers. The young people, though most were far more advanced in their skills, were very encouraging of this man and seemed to be happy for him without being condescending or impatient, which showed a positive improvement in their behaviour and an optimism for experience that was not directly related to or beneficial to them.

The young people all appeared to be very familiar with the process of file creation and were eager to operate the printer itself. However, most of the older participants were more fascinated by the CAD modelling. This is perhaps indicative of a 'learning when ready' approach discussed by Gershenfeld [4] who says that children born since the digital revolution learn by doing whereas older generations are less experimental in their learning approach.

Due to the emphasis being on 'soft skills' such as communication facilitation in this project, the aim was not to teach the participants 'hard skills' such as how to create models, which could be 3D printed. Therefore, instead they were asked each week what they would like to print the next again week, this allowed the researcher to prepare files in advance. One week, one of the older participants brought his photo album and wondered if we could 3D print something from one of his old photos. Though, technically it would be possible to either trace the photo and make it 3D or create a high contrast lithopane, he did not know this. This illustrates the gap in understanding between generations regarding how 3D printing works. One of the younger participants clarified how a 3D print is created and the older participant seemed to understand and was satisfied with that explanation. The younger person then demonstrated his resourcefulness by

suggesting how a file could be made from the photograph.

### Difficulties

It was anticipated that the behaviour of the young people may at times be challenging, however surprisingly, it was the behaviour of the older participants that was cause for most concern. This was largely due to inappropriate language and attitudes illustrated through what was made using the 3D printing pens, which could have been detrimental to the young people had it not been dealt with quickly. Therefore, this must be kept in mind when attempting similar research in future.

### Results

For the purposes of this short position paper, only one group has been expanded on, however as of January 2018, 8 different groups have been through the programme. All groups have shown a similar result, that by making, young people become focussed on their own projects and therefore more engaged with the incidental learning that occurs at the same time. With the additional intergenerational element, of pairing them up with the older people, the younger participants exhibited signs of maturity and empathy while working with their partners.

Throughout the project the young people were asked to complete self evaluation wheels to track their confidence and communication throughout the project. (See figure 1) The wheels show that 100% of participants across all groups have shown a positive change in their confidence levels. 58% feel that their communication skills have improved. In teacher testimonial feedback, one teacher said, 'the palpable benefits of increased confidence and self-esteem are invaluable to these young people.' In

terms of re-engagement and attendance levels, 75% of young people across all 8 projects sustained improved attendance 3 months after the completion of the project.

Over the course of the project, the participants completed various tasks and self-initiated projects including making little trinkets for friends and family. Through the project, the Maker values mentioned above, were shown to be incidental to making. It was not the intention to make the participants be generous by encouraging them to make something for someone else, but instead while making they instinctively began to exhibit these values. This shows that using an unstructured approach and providing an environment where people have access to tools, can foster positive behaviours and developments, which can encourage people to have a more positive experience with learning.

### **Conclusion**

There is a high rate of disengagement from education in England and Scotland, which can lead to permanent expulsion from school. This shows that there is a growing need for solutions which can re-engage young people back into education in a positive and sustainable way. This paper proposes that by using Making as part of a programme designed to facilitate re-engagement it is possible to bestow Maker culture values onto young people to foster a positive learning experience and encourage responsibility for their own learning. Data collected further validates this proposition and shows a rate of 75% re-engagement and sustained improvement in attendance for the first 3 months after the completion of the project.

Further research might consider what maker culture can offer young people in terms of identity and how this

may impact their confidence and self-esteem. With this in mind, it will be important to understand the practicalities of rolling this sort of project out on a wider scale and whether it should be available to all young people in conventional education.

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