Designing for Impact: Optimising Extra-Curricular Content for Educational Transformation in Oxfordshire

The Laidlaw Scholars Leadership & Research Programme

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Abstract

Our research examines how different types of extra-curricular activities (ECAs) (sports, arts, and academic-themed clubs) influence pupils' academic, social, and emotional development. A large amount of literature tells us that ECAs, in general, produce positive effects. Mechanisms such as school belonging, intrinsic motivation, physiological effects, and neurological restructuring help improve academic achievement through increased cognitive engagement, and indirectly from increased socio-emotional wellbeing. However, there is less attention paid to the distinct benefits of different types of activity. As a result, this paper will investigate the benefits of different kinds of ECAs. Our paper uses a mixed methods approach: we ran thematic analysis on four semi-structured interviews with teachers from four separate state-schools in Oxfordshire, coding the transcriptions with NVivo 14. Then, we calculated Pearson correlation coefficients of 51 survey responses from Oxford University students, who ranked their perceptions of the different effects of ECAs on a Likert scale. Our findings suggest that all types can produce positive benefits. However, all ECA's were linked to some downsides, or in some cases, reportedly failed to deliver the benefits they promised. Thus, self-determination and engagement may explain the heterogeneity of the effects on individuals. As such, we would recommend future research to focus on how ECAs should be structured and delivered in order to guarantee this engagement.

Keywords: extra-curricular activities, academic achievement, social bonding, belonging, self-regulation, emotional wellbeing, mixed methods.

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1. Introduction

There is a broad consensus that extracurricular activities (ECAs) have the potential to be beneficial for the development of school aged children (Marsh and Kleitman, 2002; Eccles *et al.*, 2003, Fredricks, 2011; Al-Ansari *et al.*, 2016; Aoyagi *et al.*, 2019; Clark *et al.*, 2015). However, within existing literature, less attention is paid to the distinct benefits of different types of activity. This paper investigates the benefits of different kinds of ECA, rather than generalised benefits.

Despite the diverse range of activities that a child can partake in outside of school, the literature (along with the real-life provision) tends to identify three key kinds of activity: sport based, arts based and academic based activities (Mahoney, Larson and Eccles, 2005). However, we do acknowledge other types of activities beyond the scope of this paper, including volunteering and community engagement (Barber, Mueller and Ogata, 2013), student leadership (Fredricks and Eccles, 2008) and life skills (Lee, 2017).

Further, a wide body of literature exists providing theoretical frameworks according to which the effects of these activities can be defined (Fredricks *et al.*, 2004; Larson *et al.* 2006; more citations). To account for a range of results within the literature whilst preserving detail, we will stratify effects into three categories: academic, social, and emotional.

In line with these frameworks, our focus can be framed as the following question:

> In what ways do different types of extra-curricular activities (sports, arts, and academic-themed clubs) influence pupils' academic, social, and emotional development?

We address this question in two stages: First, a literature review, both to clarify the current state of the evidence, and to inform the next stage of our research. Second, a series of interviews and surveys with stakeholders to gain practical insight through perspectives not available in the literature.

We seek to clarify the comparative benefits of different ECAs. By doing so, we aim to provide the knowledge necessary to leverage them as tools for reducing socio-economic disparities. This focus is especially important as the SDG Lab develops ECA outreach programs for schools across Oxfordshire. Fostering this conversation is crucial to ensure these initiatives achieve their fullest and most equitable impact. Our research relates to the UN Sustainable

Development Goals (SDGs) 3: Ensure healthy lives and promote well-being for all at all ages, and 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (see Table A.1 in Appendix A for the relation between the SDGs subgoals and our research).

2. Literature Review

The literature review begins by exploring the benefits of each kind of activity in and of themselves. However, our research primarily intends to inform which ECA's should be provided rather than simply mapping the differential benefits. Additionally, we consider the broad categories of academic, sport and arts-based activities as these are both the most popular and feasibly provided types of activity (Metsäpelto & Pulkkinen, 2014).

2.1. Academic-themed ECAs

Academic-themed ECAs such as debate, student council, and tutoring clubs, are primarily associated with academic outcomes (Eccles and Barber, 1999). The evidence appears strongest where ECAs promote independent, intrinsically motivated learning. Drawing on a longitudinal survey of 1,259 U.S. high-school students from 1983 to 1997, Eccles and Barber (1999) tracked adolescents over several years and found that those involved in academic clubs had higher-than-expected GPAs and were more likely to attend college, suggesting that participation in academic ECAs may support longer-term academic attainment. Similarly, Shackelford's (2019) study of the Baltimore Urban Debate League reported that debaters demonstrated improved reading and writing skills, higher standardised test scores, and reduced absenteeism, with long-term advantages in progression to selective high schools. These academic gains appeared to stem from enhanced engagement, discipline, and motivation, rather than curriculum extension. Although the study controlled for prior achievement, self-selection remains possible, so the findings should be seen as associative rather than causal.

While much of the evidence originates from the US, similar patterns have been observed in the UK. Donnelly *et al.* (2019) found that participation in structured ECAs with cognitive or academic elements can support improved academic outcomes, particularly among disadvantaged pupils, as these activities offer compensatory enrichment. However, their analysis was largely cross-sectional, so improvements relative to baseline could not be directly established.

Not all academic ECAs show consistent benefits. In the US, Curtin *et al.* (2002) reported no significant academic impact for participants in journalism or student council, unlike sports or arts ECAs. Similarly, Chanfreau *et al.* (2016), reported mixed findings in the UK context, drawing on data from the Millennium Cohort Study alongside interviews with

parents, children and ECA providers. English tuition and self-directed academic activities (such as reading for pleasure and homework) were positively associated with KS2 attainment, whereas participation in maths tuition was linked to lower outcomes. This may reflect either a weaker academic effect from certain clubs or a selection effect, whereby more academically inclined pupils gravitate to certain ECAs. In the case of maths tuition, children were likely already struggling with the subject. These findings suggest that voluntary, interest-driven activities may be more beneficial for academic outcomes than structured tuition (Chanfreau *et al.*, 2016). However, differences in how ECAs were categorised and reported may limit the strength of this interpretation.

Social and emotional outcomes have also been observed. Shackelford (2019) highlights how debate participation fosters peer bonding and a sense of belonging, with participants often describing the team as feeling like a "family" or "home". Such relationships appeared to reinforce sustained engagement, suggesting that peer support and mentorship (e.g. from coaches) may be mediating factors. In a similar vein, Gorski (2021) describes a "debate mindset" characterised by focus and motivation, which translated to a "classroom mindset" and improved behaviour and connection to learning.

Overall, academic ECAs appear most beneficial when they promote autonomy, intrinsic motivation, and peer bonding, rather than simply replicating classroom content. However, their impacts are not uniform, and further research is needed to explore causal mechanisms.

2.2. Sports ECAs

There is abundant literature supporting the benefits of sports activities on cognitive, behavioural and social processes.

Firstly, aerobic training supports learning by releasing brain-derived neurotrophic factor (BDNF). This protein promotes synaptic plasticity and neurogenesis - the processes through which pathways in the brain are refined to encode new information (Weber *et al.*, 2024).

BDNF also promotes well-being- a valuable outcome of extracurricular activities in its own right, but one that also contributes to better cognitive performance. Indeed, the chronically high cortisol levels which are characteristic of stress, depression and anxiety weaken memory, attention and cognitive flexibility (McEwen, 2007). When BDNF is released during aerobic exercise, the HPA axis is regulated- limiting cortisol release. Lower cortisol

levels also improve sleep, which is essential to memory consolidation, further improving cognitive processes.

All other types of exercise also improve wellbeing via the release of endorphins. This regulates cortisol levels as well as having more specific cognitive benefits. Broadly, dopamine enhances motivation, norepinephrine heightens attention and serotonin stabilises mood.

More specifically, open sports, meaning those occurring in dynamic environments, have been linked to improved executive control (Gökçe *et al.*, 2021). They keep certain brain pathways engaged, especially those linked to mental flexibility and switching between tasks (Becker *et al.*, 2007). It is essential to note that excessive exercise is linked to fatigue and can therefore hinder cognition - this is especially true for females (Weber *et al.*, 2024).

From a behavioural perspective, closed sports – those performed in predictable environments with consistent, often self-paced patterns – may support the development of self-regulation, a valuable skill in academic settings. Van der Kolk (2015) highlights how activities with an interoceptive focus enable individuals to notice physiological sensations which consequently allows them to be regulated. Since endurance sports rely on athletes monitoring and altering their inner states (Carver and Scheier, 2009) - perhaps even more so than open sports, which tend to offer more distractions- they may be particularly effective in fostering self-regulation. However, the literature on this is speculative and limited.

All types of exercise have been shown to foster a sense of discipline transferable to academic settings. This occurs as individuals train to push through uncomfortable physiological conditions (Burnley and Jones, 2007) but also through navigating time commitments of the activity (Lally *et al.*, 2010). However, this latter benefit may not be limited to sports but all ECAs which require a significant temporal commitment.

Lastly, certain types of exercise have been linked to social bonding which is essential in creating a sense of school belonging (Goodenow, 1993). Most obviously, team sports foster bonds between teammates as they provide frequent interpersonal interaction and shared goals (Bruner *et al.*, 2017). Though conversely sports activities are linked to reports of social exclusion (Larson *et al.*, 2006), probably when the individual does not feel part of the ingroup. Crucially, positive emotional ties to the team (ingroup affect), rather than mere similarity or group loyalty (ingroup ties), were more effective in reducing antisocial behaviour. Moreover, Tarr (2017) highlights the power elements of synchronicity in sports such as rowing or dance have in fostering social bonds. Demos *et al.* (2023) argue it blurs the sense of “self” and

"other". Dance is particularly notable because its reliance on rhythm allows large groups of people to move in synchrony (Koelsch, 2015), promoting inclusion beyond the smaller numbers typical of team-based sports. However, Festinger, Schachter and Back (1950) highlight how proximity alone – without meaningful interactions – increases interpersonal liking. In this way, any ECA which creates repeated interactions may favour social bonding.

In this way, endurance and especially open sports may be the most beneficial in promoting cognitive benefits – both via improving well-being and independently of it. Closed sports may particularly favour self-regulation. It is team sports – especially those performed in synchrony, which favour social bonding. Although these three categories have been particularly highlighted for their specific developmental benefits, all types of exercise are generally beneficial by improving well-being, fostering discipline through schedules or promoting social bonding through proximity.

2.3. Arts ECAs

An abundance of literature supports the positive influence of music on development – particularly social and academic (Ishiguro *et al.*, 2023; Ashbourne, 2015; Bradley and Conway, 2016). Pound and Harrison (2003) state that 'Music has traditionally played a strong role in supporting group cohesion' – such an expectation is verified in the literature. According to a survey and interviews completed by peripatetic instrumental teachers working in UK schools, playing an instrument led to the development of social skills – specifically teamwork (Hallam and Prince, 2000). This is unsurprising, given two mechanisms provided in the literature: those students who participate in musical activities talked more with parents and teachers, leading to higher self-esteem, and so more confidence in such interactions (Broh, 2002). Further, given that social relationships are crucial for the functioning of small musical groups (Davidson and Good, 2002), success in the group-musical domain could be generalisable to any domain involving collaboration – a potentially fruitful area for further research. Music-based activities have also been shown to be an effective facilitator of new friendships. In a case study of an English secondary school, Pitts (2007) found that students performing in a musical production developed new friendships with likeminded individuals and engaged further in the school's social life through the awareness of non-participating students of the show.

Regarding the effect of musical activities on academic achievement, the literature is less in line with conventional wisdom. Despite a well acknowledged relationship between

music and mathematics (e.g. Steinitz, 1996), Hallam (2010), in reviewing the literature on the impact of music on numeracy, finds 'mixed results'. For example, whilst Haley (2001) found that mathematics scores were higher in those who had learned an instrument prior to 4th grade, Rafferty (2003) found no effect of the Music Spatial-Temporal Maths Program on the mathematics achievement of second graders. As Hallam (2010) notes, these inconsistent outcomes may be explained by the specific type of musical activities engaged in, the intensity and duration of engagement, as well as the type of maths done by students. As such, further study is required.

The most profound effects of music on academic achievement are found in the domains of language and literacy. Anvari *et al.* (2002) found that musical skills in 4–5-year-old children were significantly correlated with phonological awareness and reading development. Evidence for the influence of such training is synthesised in Bultzaff (2000)'s meta-analysis of 24 studies on this relationship. Here, a significant positive correlation is found between music instruction and standardised measures of reading ability.

Based on the age of participants in the studies cited, musical ECA's aimed at improving social and behavioural outcomes do so most effectively in secondary-school age children, whereas those aimed at academic development are most effective at a primary school-age.

A large body of literature also exists on the benefits of dance and theatre cognitively, behaviourally and socially. Dance has been linked to similar cognitive benefits as those provided by endurance sports (Burnley and Jones, 2007; Lally *et al.*, 2010; McEwen, 2007). In addition, its reliance on learning and recalling choreography is linked to improved memory (Minton, 2016). It could be inferred that similar benefits exist in other arts like theatre and music, which also involve memorisation. The interpretive nature of dance and theatre encourages introspection. According to Van der Kolk (2015), they should thus foster self-regulation, enabling individuals to explore emotions in a safe space, which can enhance emotional awareness and control. Lastly, because dance involves embodied cognition (Barsalou, 1999) – learning through physical experience – it may develop empathy by encouraging participants to connect with characters' lived experiences through movement (Minton, 2016). Therefore, alongside the previously mentioned benefits of synchronicity, it may be particularly effective in developing social bonds.

There is also literature supporting the academic, emotional and social benefits of Visual Arts. From an academic standpoint, Bolwerk *et al.* (2014) found that active engagement in art making increases functional connectivity between the PCC/preCUN and frontal-parietal

areas, which is associated with improved reflection and mental flexibility. Moreover, Punzalan (2018) demonstrated that using visual arts as a medium to learn is particularly successful. Their experiment aligns with Barsalou's principle of embodied cognition: students who learned through visual arts performed significantly better than those taught through traditional lectures. Behaviourally, DiBenetto and Garrett (2018) found that engaging in art promotes intrinsic motivation and goal setting in adolescents-skills which are crucial in academic settings. Additionally, Law *et al.* (2021) reported improvements in wellbeing via reductions in stress and systolic blood pressure following even passive exposure to art. Whilst these benefits are important in and of themselves, the associated reduction in cortisol creates further cognitive benefits (McEwen, 2007). However, the authors of both studies emphasise the need for more rigorous, randomised studies to confirm the effects. Socially, Hetland & Kelley (2022) show how participation in community-based visual arts programs strengthens social support networks. However, it remains unclear whether these effects are specific to the art-making process itself or more broadly related to community engagement.

2.4. Engagement, Identity and Belonging

Whilst the raw benefits of the discussed activities are numerous, we must consider in what ways the positives of ECA participation are experienced by individuals. In this way it is crucial to investigate firstly: the extent to which individuals are capable of accessing these general benefits and secondly: whether the effects of ECAs are mostly beneficial in and of themselves or only as a proxy to greater results.

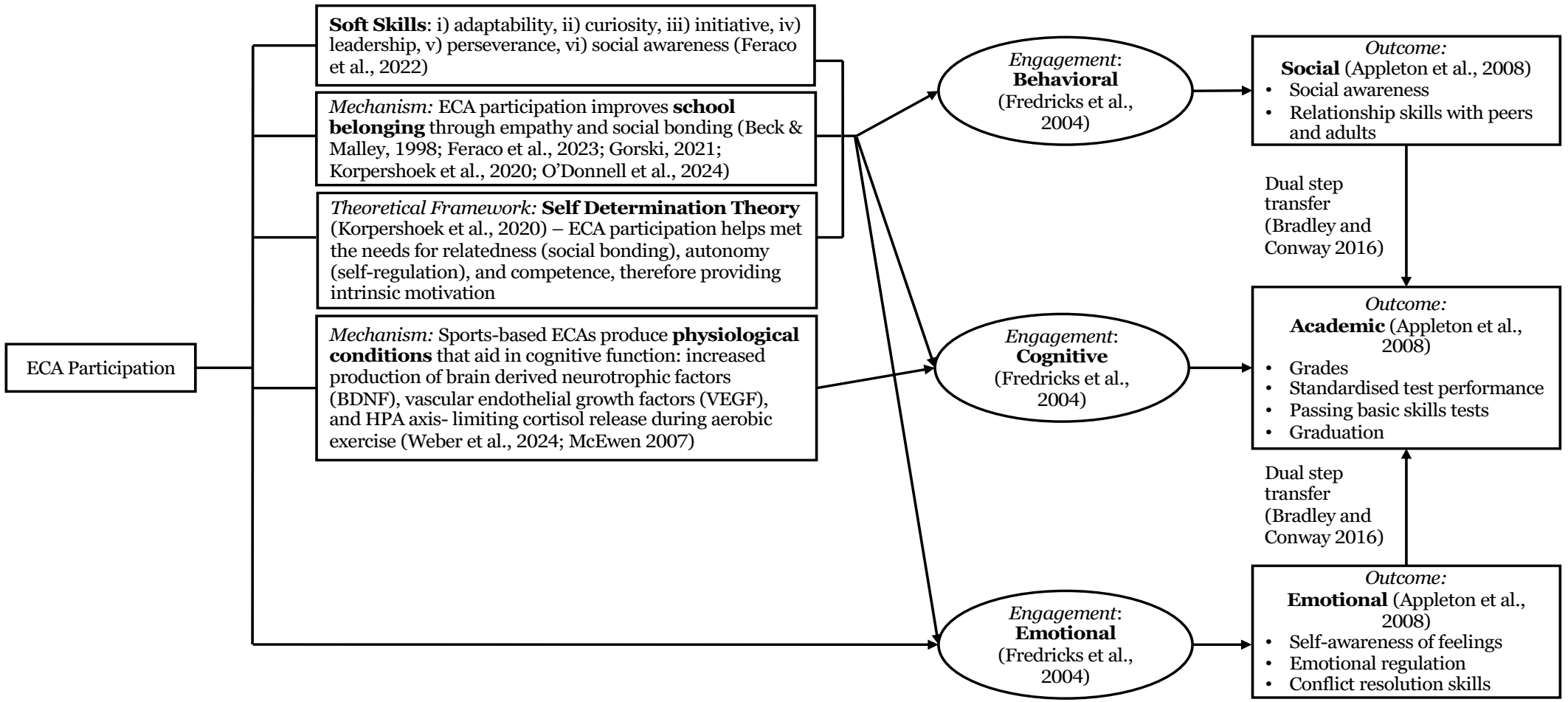
There is evidence that students from lower SES backgrounds benefit in different ways from ECA's allowing them to benefit "as much if not more" than pupils from higher SES families. This is partially due to diminishing returns to activities beyond a threshold (Marsh and Kleitman, 2002). As such, activities ought to actively attract both those lower SES students and those who are currently disillusioned with existing ECA's to widen the impact. This is further evidenced by Eccles *et al.* (2003), who demonstrate that students participating in activities they do not identify with, and those who are *not* participating in an activity they *do* identify with report higher rates of depressed mood than those whose activities are in line with their identity. This shows how identity-activity alignment is crucial to reap the rewards of a given activity. Finally, results from Carbonaro and Maloney (2019) provide cause to question the extent of the causal benefits of ECAs. Controlling for selection bias with a more advanced

‘cross lagged panel model’ they discover only meagre advantages from increased ECA participation. This indicates that the ECA’s as a provision may not always actually translate the benefits of the activities into the hypothesised socio-emotional and academic benefits. As such attention should be paid to how programmes of activities are effectuated to provide benefits without simply furthering inequality though self-selection (this appeal is also echoed by Eccles *et al.* (2003)).

If then ECA benefits are minimal in and of themselves, their key role may be to simply mediate an increased engagement and identification with school and reduce the risk of dropout. School engagement has been conceptualised as a key factor influencing academic achievement by encompassing the degree of students' commitment towards school and academic learning (Costa *et al.*, 2023; Fredricks *et al.*, 2004). ECAs are also found to increase school belonging (Beck & Malley, 1998; Feraco *et al.*, 2023; Gorski, 2021; Korpershoek *et al.*, 2019; O’Donnell *et al.*, 2023). This hypothesis suggests that intrinsic motivation can be strengthened when participants maintain a minimum of positive significant interpersonal relationships. Moreover, Finn (1989) notes that ECA participation can act as ‘primary source of attachment to school for students whose academic work is weak’. Indeed, ECA participation has been found to reduce dropout rates even when controlling for circumstances which make dropout likely (McNeal, 1995; Neely and Vaquera, 2017).

Thus by fostering a sense of school commitment and belonging, identity formation and by developing students social networks ECA’s have mediated effect on engagement which in turn still indirectly contributes to academic outcomes positively by means of a dual step transfer mechanism where a supportive and motivate learning environment is fostered (Bradley and Conway, 2016; Eizadirad *et al.*, 2022; Ishiguro *et al.*, 2023). These conceptual constructs are shown below.

Figure 1. A pathway of the various constructs surrounding ECA participatory outcomes



3. Methods

A mixed-methods approach was used to collect data to answer the research question – this consisted of qualitative analysis of interviews with teachers, and university student survey responses on the perceived outcomes of different ECA types.

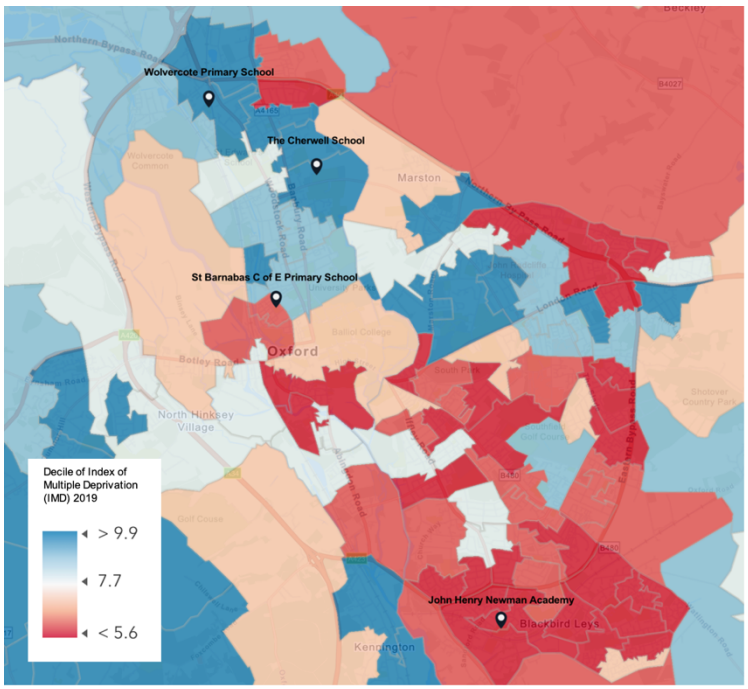
Following Appleton *et al.* (2008), these outcomes are split into three categories: academic, social, and emotional. This framework is justified in its mirroring of a basic three-way distinction common in the literature, generally following the trend of separating academic (or more broadly, intellectual) social, and emotional outcomes (Fredricks, 2004; Metsäpelto *et al.*, 2015). Following the literature review the next step was to collect evidence regarding the outcomes of ECA's found by other researchers and relate them to our existing understanding. Initially, we divided the literature according to different kinds of ECA: sports, arts, and academic. Data was gathered via semi-structured interviews with teachers in the Oxford area. Lastly, the research was conducted in view of the SDG lab's longitudinal intention to provide ECA's for schoolchildren in Oxfordshire area.

An email was sent to 26 schools within the Oxford area to probe interest and availability. In total, four schools were interviewed. Basic interview questions were designed during informal interviews with teachers. They were then adapted according to the direction of individual interviews. Interviews were conducted individually online (see Appendix B for details of ethical considerations). The average duration of these was approximately 10 minutes.

Table 1. Background information on the schools interviewed at the time of writing

School	*School type*	*Gender*	*Age range*	*Ofsted rating*	*Number of pupils*	*Proportion eligible for free school meals*
John Henry Newman Academy	Academy sponsor led	Mixed	Primary (3–11)	Good	394	37.8%
St Barnabas C of E Primary School	Voluntary aided school	Mixed	Primary (3–11)	Good	153	14.6%
Wolvercote Primary School	Academy converter	Mixed	Primary (3–11)	Good	331	11.8%
The Cherwell School	Academy converter	Mixed	Secondary (11–18)	Outstanding	2008	17.6%

Figure 1. A map of the schools interviewed showing geographical location within Oxford, and the IMD (2019) of area. Mapped using ArcGis Online.



In addition to interviews, an online survey was sent to undergraduate students at the University of Oxford to assess their involvement in ECAs (sports, arts, and academic-themed clubs) and their perceived benefits across academic, social, and emotional domains (see Appendix C for full survey questions). The survey link was circulated via Junior Common

Room (JCR) group chats across 10 colleges and yielded a total of 51 responses. Involvement of ECAs was rated on a 5-point Likert scale (1 = not involved, 5 = very involved), and perceived benefit was measured on a 5-point agreement scale (1 = strongly disagree, 5 = strongly agree). The final question (question 14) also included an open text box to gather additional qualitative insights.

3.1. Data Analysis

Interviews were transcribed using the built-in Transcribe in Word feature in Microsoft 365's online version of Word, which were manually checked afterwards. Thematic analysis was then conducted using NVivo 14 to code references. Quantitative survey responses were analysed using descriptive statistics (mean and standard deviation) to summarise levels of involvement and perceived barriers. Relationships between variables were examined using Pearson's correlation coefficients, and the significance of observed effects was assessed with permutation tests. All analyses were conducted in Python (version 3.12.4, Anaconda distribution) using the packages *pandas*, *numpy*, and *scipy*. Figures were produced using *matplotlib* and *seaborn*.

4. Results and Findings

4.1. Thematic Analysis in Interviews

4.1.1. Academic Benefits

The interviews revealed a range of perspectives on which types of ECAs best support academic achievement. Several themes emerged, including: the importance of enjoyment; the value of targeted academic support; the development of transferable soft skills; and the role of ECAs in providing access to cultural capital.

One interviewee suggested that the most efficient ECAs are simply those which students enjoy the most, to create an incentive to attend school. They noted:

> "I've got one girl… she doesn't come into school that much unless they've got a game of football on the day or training".

This is reinforced by another interviewee who notes that ECAs, which increase self-esteem, feedback into learning.

> "Because, if you're being successful in one area as well, then, you know, that transfers".

Structured academic ECAs like tutoring or homework clubs are also suggested to offer a clearer and more targeted impact. One interviewee explained this is particularly relevant for the students from families who:

> "don't necessarily have the technology or the headspace"

to support them at home. Providing such activities in school hours is suggested to minimising socio-economic disparities.

Another interviewee highlighted that learning does not only happen through tutoring. For instance, the football club:

> "[…] learn about the brain through the impacts of heading a football".

Similarly, the mechanics club learn about mathematics and engineering. Therefore, ECAs exploring academic content in alternative ways also play a role.

In addition, extracurriculars that build soft skills offer indirect academic benefits. One interviewee said of students involved in music:

> "Broadly speaking… they tend to be the ones who are more academically able,"

While a direct causal link is hard to determine, they noted several cases where involvement in music led to "a big improvement in […] working memory," which then transferred into classroom performance.

Lastly, one interviewee discussed a theatre trip, considering the role of ECAs have in providing cultural capital against socioeconomic barriers:

> "The arts that aren't free… Money is always barrier for schools and for families".

Therefore, such activities can offer students access to experiences and knowledge, which has the power to contribute to their academic success.

4.1.2. Social Benefits

The social impact of ECAs were discussed explicitly in only two of the four interviews conducted. Notably, it was referenced solely in relation to sports and arts-based clubs, with no mention of academic-themed clubs. Four key themes emerged regarding how such activities foster social bonding among students.

The first theme is the creation of inclusive social spaces. Both arts and sports were described as offering entry points for students who may initially struggle to find a sense of belonging. One interviewee highlighted the value of drama, music, and art, reporting that they are:

> "[…] so important for the kids that don't have a place sometimes when they first get here."

These clubs appear to serve as safe spaces where students can meet likeminded peers outside of dominant social groups. Likewise, sports (particularly basketball) were noted for attracting:

> "A real mix of characters, a real mix of behaviour expectations within them, and backgrounds."

This suggests the capacity of sports to unite students from diverse social and behavioural contexts.

The second theme centres on the development of collective identity and group cohesion. One interviewee referred to the "lifestyle" or "culture" associated with being a basketball player, implying that involvement in sport constructs a recognisable social role and a sense of in-group identity. Similarly, arts-based activities appear to create micro-communities built around shared interests and experiences, often welcoming "students… who maybe haven't naturally fit in in other parts of the school."

The third theme is the bridging of social divides through shared experience. Both interviewees emphasised how participation in music and sport can lead to unexpected or cross-group friendships. One interviewee described music-making as a "shared emotional experience" that brought students together across previously held social barriers, observing that "we've really seen children bonding… that they maybe weren't keen to be friends with before." Another interviewee echoed this idea, noting that basketball in particular fostered social links that extended beyond the activity itself:

> "I've seen the biggest kind of link with the social aspect outside of that sport."

An interesting symmetry was observed between two interview responses, regarding the effect of ECA facilitators on student behaviour. One interviewee reported that:

> "…kids struggle more to regulate themselves… because we have sports coaches this year that weren't actually stopping [problematic behaviour]."

Whilst another said that, in a basketball club:

> "If your behaviour is not right, you can't take part and you can't represent the school… we have definitely seen, in lots of these students, their behaviour improved"

The relation between these two answers points to an important, idea: the behavioural boundaries established by ECA providers can have a huge impact on the behavioural outcomes of a given ECA.

4.1.3. Emotional Benefits

Two themes relating to emotion emerged from our analysis of the interviews: improved confidence and improved emotional self-regulation.

Involvement in a school musical production was reported by an interviewee to improve the confidence of their pupils. They said:

> "Joining in with that passion, that excitement of learning music, they have found this confidence and this ability to [...] put themselves forward."

This theme, that engagement in music – and drama – related ECA's allows for the discovery of confidence in children, was present in another interview. As mentioned earlier, an interviewee reported that, for the 'kids that don't have [...] a place sometimes when they first get here', when engaged in music – and drama – related ECA's, 'you see them kind of get more confidence going'.

Regarding the theme of emotional self-regulation, music-playing was reported by one interviewee to have a key role. Speaking about a specific student, this interviewee reported that:

> "Their ability to self-regulate has improved a lot since we've been able to let them go and just play the piano [...] it's amazing to hear what progress they've made themselves both in regulating, but also just in picking up tunes"

In other words, self-teaching an instrument has had a significant effect on the behaviour of a student in school, which our interviewee attributes to self-regulation. This interviewee also suggested that, of all instruments used to self-regulate, '[drums and piano] tend to be the most effective'.

4.1.4. Engagement

A final theme in the interviews was discussion of engagement with ECA's provided, as well as 'school engagement' in a sense similar to Fredricks (2004). Teacher's first noted that lack of engagement with homework caused a "negative cycle":

> "we were finding that the children were not doing it, and then teachers were feeling frustrated with the lack of engagement. And then, you get into a bit of a sort of negative cycle about home learning. But it's not the child's fault."

Similarly, if a child is doing an ECA they do not identify with, this 'negative cycle' could arise. Another respondent noted:

> "I grew up playing volleyball. So, we did a term on that. And the exposure of the engagement was huge because it was something exciting that they were doing. So, if it's, you know, if it's just academic, you're not going to achieve it. If it's just football, I think you're equally not going to achieve it."

This demonstrates that teachers do consider more than the potential benefits of an ECA, but also the interest in the activity from the students. When it comes to the role of ECA's in promoting school engagement, there were also some promising results. Three of the interviewees referenced mechanisms analogous to a dual transfer model – the idea that non-cognitive skills could be transferred to other engagements to improve academic outcomes. One interviewee noted the importance of ECAs in restoring the self-confidence of a student who thrived in sports, who was not the strongest academically:

> "So, for her, that sort of self-esteem will hopefully impacts [sic] on academic outcomes. Because, if you're being successful in one area as well, then, you know, that transfers."

Another interviewee recognised how the music-making skills derived from a student's enjoyment in orchestra would transfer to cognitive engagement, in the form of memory skills, and thus improve academic outcomes:

> "It's really interesting to see that... learning those skills of following the music together with everybody else... she has really transferred those skills into the classroom, and we've seen a big improvement in her working memory, and therefore her ability in class."

One interviewee noted the influence of external environments and social contexts on a participant's engagement with the ECA. Particularly, this relates to the home environment and the encouragement one receives by parents. However, the quality of the teacher also seems to have an effect on engagement, denoting a logistical separation between the theory and the practical effects:

> "...but that plays a large part... if they've got a teacher of that instrument—the extent to which that teacher is enthused about supporting them... But for some of the children, if they don't have that support at home... their engagement levels will often drop off."

Lastly, engagement was dependent on pre-existing levels of self-regulation:

> "I think there are some children who maybe struggle more with self-regulation… the kind of sensory overload of being in the orchestral ensemble [is] so exciting, that they can struggle to kind of engage positively"

4.2. Survey Responses Analysis

A total of 51 Oxford students completed the survey assessing involvement in ECAs (sports, arts, and academic-themed clubs) and their perceived benefits across academic, social, and emotional domains (Table 2).

Table 2. Descriptive statistics for Oxford student survey responses (n=51)

	Count	*Mean*	*Std*
Sports Involvement	51	2.73	1.37
Arts Involvement	51	2.92	1.41
Academic Involvement	51	3.02	1.46
Financial Limitations	51	2.06	1.12
Sports: academic benefit	47	2.62	1.09
Sports: social benefit	48	3.83	1.10
Sports: emotional benefit	48	3.90	0.97
Arts: academic benefit	47	3.26	0.99
Arts: social benefit	47	3.55	1.12
Arts: emotional benefit	47	3.70	1.25
Academic: academic benefit	46	3.91	0.98
Academic: social benefit	46	3.02	1.04
Academic: emotional benefit	45	2.73	0.94

4.2.1. Levels of Involvement

Participants reported moderate levels of involvement across all three ECA types. Academic activities had the highest mean involvement (mean = 3.02, sd = 1.46), followed by arts (mean = 2.92, sd = 1.41) and sports (mean = 2.73, sd = 1.37). This ordering may reflect the academic orientation of the Oxford student population.

Reported financial limitations affecting participation were relatively low (mean = 2.06, sd = 1.12), suggesting limited economic barriers to involvement. However, financial

considerations may still operate both at the family level (e.g. affordability of fees, equipment, or travel) and the institutional level (e.g. school budgets determining what activities can be offered). Qualitative responses added context around institutional constraints:

> "I think choice of extracurricular activities becomes increasingly limited when you get older as a student at a state school, as resources for the school to run a range of sports becomes limited."

Other responses suggested that academic scheduling pressures (such as compulsory GCSE prep sessions) also limit ECA participation for older students. Taken together, these findings indicate that barriers are multi-layered. Structural constraints (e.g. timetabling, resource allocation) play a major role, and financial constraints arising from both school and family budgets also shape opportunities for involvement.

4.2.2. Perceived Benefits by Activity Type

1) Sports ECAs

Perceived benefits were highest for emotional (mean = 3.90, sd = 0.97) and social (mean = 3.83, sd = 1.10) domains, but lower for academic benefit (mean = 2.62, sd = 1.09). Indeed, one student noted that:

> "Sports helped self-regulation because of the schedule/ commitment it created. It helped peer bonding because the amount of time spent with the team."

This aligns with literature suggesting that sport is more strongly associated with socio-emotional than academic outcomes.

2) Arts ECAs

Arts involvement was associated with moderate to high benefits across all three domains: academic (mean = 3.26, sd = 0.99), social (mean = 3.55, sd = 1.12), and emotional (mean = 3.70, sd = 1.25). This suggests a broadly positive perception of arts involvement, particularly for emotional and social development. There may be some variation within the arts, as one student noted:

> "Confounded answers for music as band practice was great for socials but solo lessons were not and even disheartening."

This nuance may explain the slightly broader standard deviations in emotional benefit.

3) Academic-themed ECAs

Perceived academic benefit was rated the highest of any category (mean = 3.91, sd = 0.98). Indeed, one student noted that the 'only perceptible causal impact was academics on academics. In contrast, social (mean = 3.02, sd = 1.04) and emotional benefits (mean = 2.73, sd = 0.94) were rated lower, suggesting that these activities are perceived as primarily academically oriented.

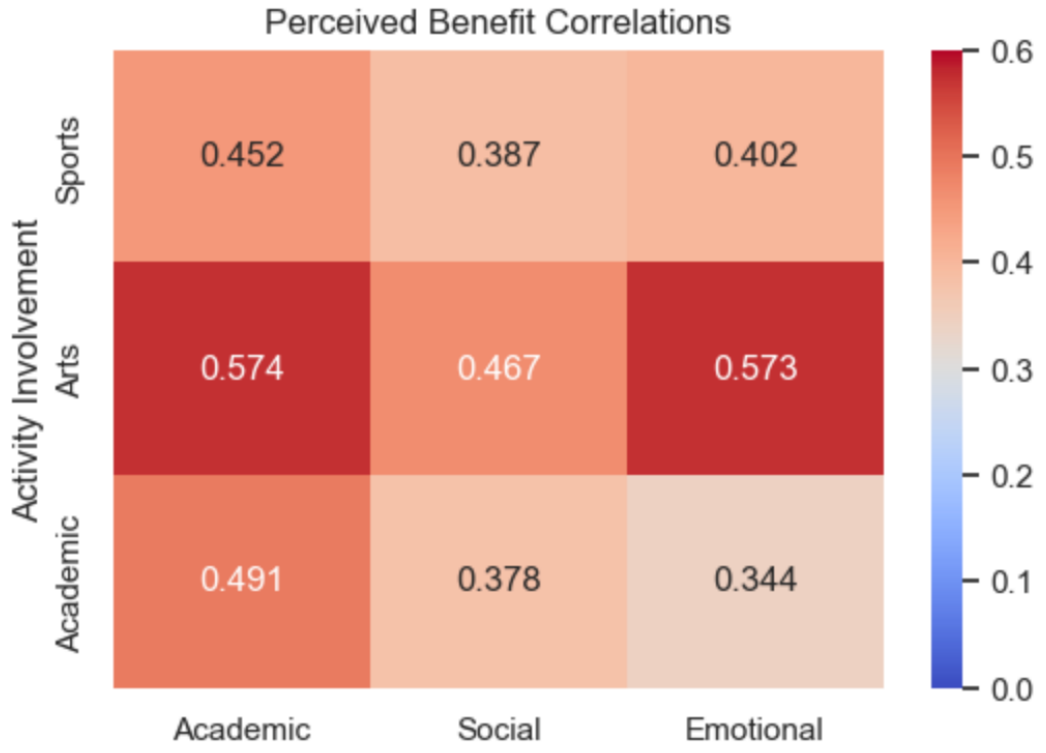
4.2.3. *Correlation analysis*

Table 3. Pearsons correlation coefficients between level of activity involvement and amount of perceived benefit with p-values:

Extra-curricular activity	*Academic benefit*	*Social benefit*	*Emotional benefit*
Sports	0.452	0.387	0.402
	($p < 0.01$)	($p = 0.012$)	($p < 0.01$)
Arts	0.574	0.467	0.573
	($p < 0.01$)	($p < 0.01$)	($p < 0.01$)
Academic-based	0.491	0.378	0.344
	($p < 0.01$)	($p = 0.015$)	($p = 0.028$)

Pearson's correlation coefficients were calculated to explore the relationship between self-reported involvement levels in each activity type (sports, arts, academic) and perceived academic, social, and emotional benefits (Table E.2; Figure 3). All three activity types showed statistically significant positive correlations with all benefit domains, but the strengths of association differed.

Figure 2. Heatmap of Pearson correlation coefficients between level of activity involvement and perceived benefit



Sports involvement moderate positive correlations with academic ($r = 0.452$, $p < 0.01$), social ($r = 0.387$, $p = 0.012$), and emotional ($r = 0.402$, $p < 0.01$) domains. This suggests that greater participation in sports is moderately associated with stronger perceptions of benefit, particularly for social bonding, emotional regulation and wellbeing.

Arts involvement showed the strongest set of correlations overall: academic ($r = 0.574$, $p < 0.01$), social ($r = 0.467$, $p < 0.01$), and emotional ($r = 0.573$, $p < 0.01$) – indicating greater involvement in arts activities is linked to perceived academic achievement, self-regulation and wellbeing. This supports the descriptive findings in section 5.2.2 and highlights the arts as a particularly impactful domain for students.

Academic-themed clubs also showed positive (although slightly weaker) correlations with academic ($r = 0.491$, $p < 0.01$), social ($r = 0.378$, $p = 0.015$), and emotional ($r = 0.344$, $p = 0.028$) domains. While the strongest association remains with perceived academic achievement, these findings indicate that academic clubs may also offer some social and emotional benefits.

Overall, the correlation results suggest that greater ECA involvement is generally associated with stronger perceived benefits, with arts activities showing the most consistent

perceived impacts across all domains. It must be noted that due to the small sample size and likely selection bias by surveying university students, these findings possibly do not demonstrate causality only association. Further research and trials would be required to determine whether and how particular types of activity directly influence perceived outcomes.

4.2.4. Permutation tests

Permutation tests (paired samples, one-tailed) were conducted to assess whether participants perceived greater benefits from one type of ECA over another within each domain. These tests compared arts, sports, and academic ECAs, using the mean difference in reported benefit as the test statistic.

Academic clubs were perceived to provide significantly greater academic benefit than both arts (statistic = 0.683, $p < 0.01$) and sports (statistic = 1.17, $p < 0.01$). Arts also scored significantly higher than sports for academic benefit (statistic = 0.488, $p = 0.0282$).

For social benefit, both sports (statistic = 0.878, $p < 0.01$) and arts (statistic = 0.585, $p < 0.01$) were rated significantly higher than academic. However, there was no statistically significant difference between sports and arts (statistic = 0.293, $p = 0.0962$).

For emotional benefit, both sports (statistic = 1.17, $p < 0.01$) and arts (statistic = 1.0, $p < 0.01$) were rated significantly higher than academic clubs. However, the difference between sports and arts was not significant (statistic = 0.171, $p = 0.247$).

Overall, these results are consistent with domain specificity in perceived benefits, whereby academic clubs tended to be rated highest for academic benefit, whereas sports and arts tended to be rated higher for social and emotional benefits. However, because these findings rely on self-reports, are cross-sectional, and involve multiple pairwise comparisons with one-tailed tests, they should be tentatively interpreted as exploratory results that highlight perceived associations.

4.2.5. Comparison with Interview Data

Below is the hierarchy chart of coding references for the positive perceptions on the academic, social, and emotional outcomes in the four interviews conducted, shown by a table and through a visualisation. Comparing the survey responses and interview data, it is noteworthy that arts ECA participation, in both cases, have the most instances of perceived improvements in social and emotional outcomes. Improvements is academic outcomes is strongest in academic-themed ECAs in the interview data, compared to arts ECAs in the

survey data. However, the limited data collected through interviews (with the total interview material just totalling 40 minutes) prevents any conclusive links when comparing these data sets.

Figure 3. A hierarchy chart of coding references, in interview transcripts, for academic, social, and emotional outcomes across arts, sports, and academic-themed ECAs. Produced with NVivo 14.

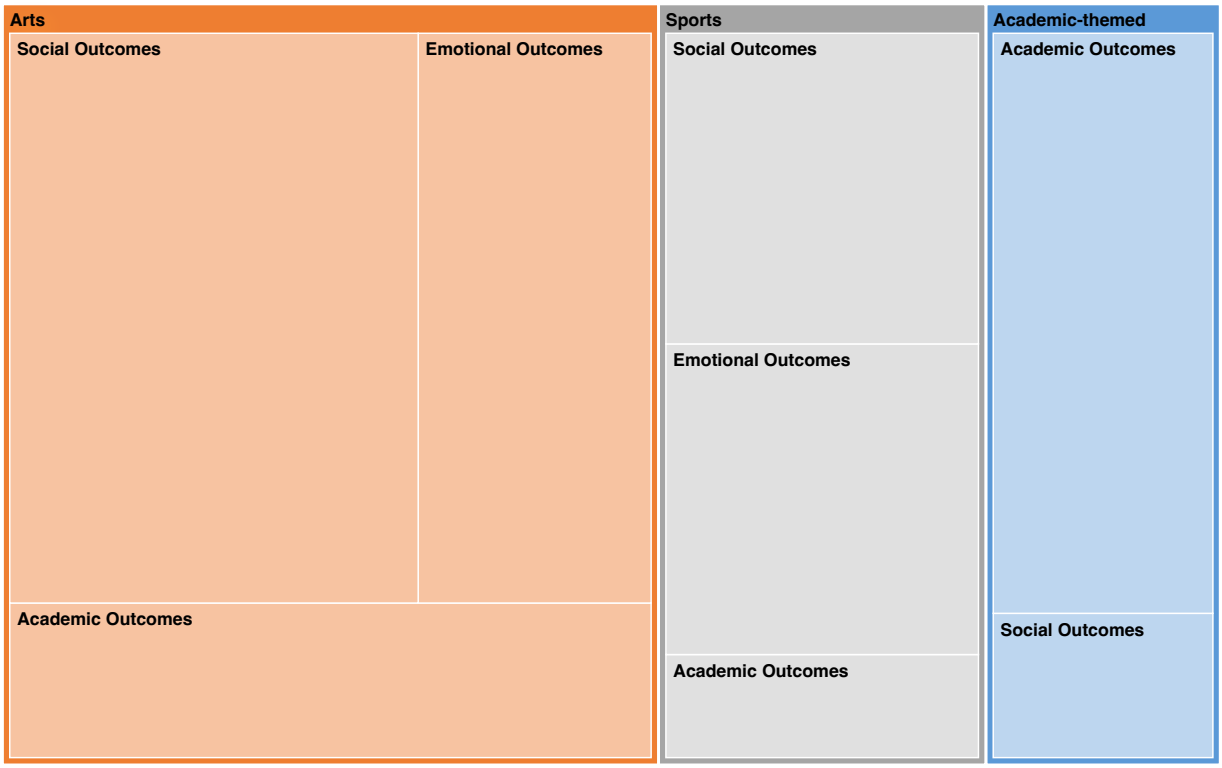


Table 4. A hierarchy list of coding references, in interview transcripts, for academic, social, and emotional outcomes across arts, sports, and academic-themed ECAs. Produced with NVivo 14.

Codes	*Number of coding references*	*Number of items coded*
Academic-themed\Academic Outcomes	4	3
Academic-themed\Emotional Outcomes	0	0
Academic-themed\Social Outcomes	1	1
Arts\Academic Outcomes	3	1
Arts\Emotional Outcomes	4	1
Arts\Social Outcomes	7	3
Sports\Academic Outcomes	1	1
Sports\Emotional Outcomes	3	2
Sports\Social Outcomes	3	2

5. Discussion

Our results from the interviews identify direct and indirect effects on students' educational outcomes. In some cases, such as the effect of sports activities on increased social bonding, the relationship was direct. Here, friends were made (reportedly) due to their participation in an activity with students they wouldn't have met otherwise. In other cases, such as the effect of music/sports activities on academic engagement in class, the ECA's role was mediated through better behaviour, attendance in school or the self-perception of success in school, lending credence to the dual-step hypothesis discussed (Bradley and Conway, 2016).

Wide benefits were attributed to nearly all kinds of ECA, although the extent and distribution of these different benefits varied. As observed in the literature (Davidson and Good, 2022; Bruner *et al.*, 2017), sports and music both have an emotionally regulating effect. Through identity formation, confidence building and group-work help to build social networks and friendships, producing a dual-step effect on academic attainment. Interview responses and survey data on academic-based clubs did not indicate a strong relationship to social or behavioural effects. This aligns with the corresponding literature which argues academic-themed ECAs develop independent learning, rather than collaboration (Eccles and Barber, 1999). Instead, interviewees emphasised the role of academic-based clubs in academic development. One interviewee highlighted that, given that closing the attainment gap between children of different socio-economic backgrounds is crucial, and that the effect of academic ECAs on attainment was most profound, academic ECA's should not be neglected. Though this is contrary to mixed perceptions from Chanfreau *et al.* (2016) that observed decreased academic attainment in maths tuition participation. In the instances where academic-themed ECAs were mentioned by interviewees, these often take the form of structured tuition. As Shackelford (2019) suggests, academic gains from ECAs should stem from the soft skills developed, such as discipline and motivation, rather than the content delivered itself. This may explain why some interviewees expressed academic ineffectiveness with homework clubs and similarly structured activities. Overall, all three types of ECA can have wide-ranging and impactful benefits on the children who take part in them; however, the specific differences leave it up to a value judgment from parents, pupils, schools and providers as to which benefits are most desired.

It is important to make a distinction between two senses of 'the effects of an ECA'. Firstly, there is the possible effect of an activity on a model student, assuming that they are

fully engaged. Here, the ‘effect’ assumes this student will reap the potential full rewards from the activity, both due to the quality of the implementation of the activity, and the engagement of the student. Secondly, 'effect’ can be understood in terms of the chance of a given student receiving the potential benefit. As such, the recommendation of an ECA depends on a balance between the optimal potential effects of an activity, and the real likelihood that the students to whom the activity is offered engage in it sufficiently. This, in turn, will be in light of what pupil and parents are looking to receive from an ECA, and their interest in the ECA’s that might be offered.

Thus, considering the second sense of ‘effect’, prescription of an ECA in light of these results is not yet obvious. If there is no clear ‘most beneficial’ ECA, what can guide choice between them? As identified in our interviews, both the reason ECA's have the effect they do, and a way of choosing between them, may be provided by the notion of 'engagement'. In line with the literature, teachers reported students engaging more with classwork when they felt successful in another domain and behaved better in class after engaging in music or sport (sometimes to ensure they were allowed to play in school teams). Regarding the different forms of engagement (Fredricks, 2004), development of all three domains of engagement was promoted by ECA's. The student mentioned who rarely attended school except for sports, or the students linking their sports lessons to academics saw a development of their cognitive engagement. The students encouraged to behave by their desire to play in the school sports teams experienced better behavioural engagement. Finally, the students able to use music to control their emotions, and the students developing positive social networks, as in Pitts (2007), showed stronger emotional engagement.

Crucially, engagement refers to internal willingness and active participation. As such, for these benefits to be transferred, the promise of some effect is not sufficient to guarantee its success. Instead, benefits will be larger when the student either *wants* to partake or identifies with it (Eccles *et al.*, 2003; Fredricks, 2004). Crucial mechanisms for developing this are self-determination, identity formation, and developing a sense of belonging. This is not to say engagement is sufficient or strictly necessary for ECA benefits but its presence is certainly highly important.

5.1. Limitations

Our research was marred by several key limitations. Primarily, we could not collect any data from children themselves due to a lack of ethical clearance. Due to the brevity of the research

project, we were attempting to contact teachers in the final weeks of the school year. Given their work timetable within the year, we received very limited responses. Our sample is thus not representative of the population. Likewise, it is worth noting that the teachers in interview were only able to report on their observations. The teachers themselves noted (as the literature did) that observing benefits from ECA's – especially from an experiential observation – is extremely confounded by socio-economic conditions and the support that is provided at home. In addition, our survey sample was self-reported from University of Oxford students. As admission to the university selects for academic ability this would suggest a sample biased towards high performers. This also a confounding variable as it is moot whether ECAs helped them to achieve highly, or if their high achievement led to them wanting to participate. However, it is worth noting that the nature of our study relates to the outcomes of ECAs comparatively.

6. Conclusion

In conclusion, both the literature and interviews highlighted a range of academic, behavioural and social benefits across sports, arts and academic based ECAs. Except for a few physiological effects of exercise, the benefits are rarely isolated to a single category. As a result, it may fall to self-determination and engagement to explain the heterogeneity of the effects on individuals. This indicates that what should be recommended will generally be the activity which will engage the most currently non-participating and unengaged students. Providing them with a sense of self-determination, identity and belonging in their social groups and school. This might be music, football or a chemistry club; however, it is unlikely that any one will engage all students. Thus, ideally the provision of ECA's should simply aim to represent precisely those students who are lacking in school engagement and who do not already have an activity with which they identify.

In light of this, we would recommend future research should have a strong focus on optimising ECA structure (e.g peer-led or one-on-one), location of delivery (school, youth groups) and the qualities of activity leaders. Given the limitations of our research, it is highly important that any further work done on this question in Oxford directly engage young people and test the benefits of different provisions.

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Appendix A

Rationale Of Research

Table A.1 outlines how our research relates to the subgoals of the UN's Sustainable Development Goals (SDGs) 3: Ensure healthy lives and promote well-being for all at all ages, and 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Table A.1. The SDG's in relation to our research

Subgoal Number	*Subgoal*	*Indicator Number*	*Indicator*	*How our research relates to this subgoal*
3.4	By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	3.4.1	Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease	We observe the social and emotional effects of different types of ECAs, which improve mental health.
		3.4.2	Suicide mortality rate	
4.1	By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	4.1.1	Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex	We observe the effects of different ECAs on participants' cognitive engagement, which directly influences academic outcomes. Additionally, observing behavioural and emotional engagement in different ECAs is theorised to improve social and emotional outcomes through an increase in school belonging – thus, reducing school absentees.
		4.1.2	Completion rate (primary education, lower secondary education, upper secondary education)	
4.2	By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education	4.2.1	Proportion of children aged 24–59 months who are developmentally on track in health, learning and psychosocial well-being, by sex	
		4.2.2	Participation rate in organized learning (one year before the official primary entry age), by sex	
4.6	By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	4.6.1	Youth/adult literacy rate	We observe the effects of different ECAs on participants' cognitive engagement, which directly influences academic outcomes.

Appendix B

Ethical Considerations

Prior to each interview, the interviewer would provide background information on the SDG Impact Lab, the Laidlaw Scholars Programme, and the possible contributions of our findings to a longitudinal study into ECAs in Oxfordshire. After explaining this, we acquired verbal confirmation to both record the interview via a vocal recording application on a separate mobile phone, and use the anonymised data for our research. Throughout, we assured the participants that recordings would be securely stored, only accessible to the research team, and deleted upon completion of the project. Participants were also made aware of their right to withdraw from the study at any time, without needing to provide a reason.

Appendix C

Oxford Student Survey Questions

Below are the questions included in the survey distributed to undergraduate students at the University of Oxford. To view in the given format, see the responder link: https://docs.google.com/forms/d/e/1FAIpQLScFDxQ2leLhEYT_bukJZVeJhkAMwIY1qG1Qh_uBPIewmdnFug/viewform?usp=header

1. From 1-5 (1 = not involved, 5 = very involved), how involved were you in **sports** clubs during school?
2. From 1-5 (1 = not involved, 5 = very involved), how involved were you in **arts** clubs (e.g. music, drama, knitting) during school?
3. From 1-5 (1 = not involved, 5 = very involved), how involved were you in **academic** clubs (e.g. debating, chess, tutoring) during school?
4. From 1-5 (1 = not limited, 5 = very limited), to what extent do you think that you were limited in your choice of extracurricular activities due to financial reasons?
5. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **sports** clubs benefitted your *academic achievement*?
6. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **sports** clubs benefitted your *social bonding*?
7. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **sports** clubs benefitted your *self-regulation and wellbeing*?
8. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **arts** clubs benefitted your *academic achievement*?
9. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **arts** clubs benefitted your *peer bonding*?
10. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **arts** clubs benefitted your *self-regulation and wellbeing*?
11. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **academic** clubs benefitted your *academic achievement*?
12. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **academic** clubs benefitted your *social bonding*?
13. From 1-5 (1 = strongly disagree, 5 = strongly agree), to what extent do you agree that participating in **academic** clubs benefitted your *self-regulation and wellbeing*?
14. Please share any thoughts or reasons behind how you rated the benefits.