Youth Investment Fund: Learning and Insight Paper Eight

Simulating the economic benefits of youth work

David Pritchard and Karen Scanlon

May 2021

Contents

1. Executive summary

1.1. Introduction

The value of investing in the social and emotional development of young people may seem obvious. No one disputes that healthy, sociable, confident, conscientious, and productive young people are good for society today and for its future. But this doesn't help answer specific, yet fundamental, questions such as: how much difference can youth services make to the social and emotional skills of young people? And how much is it worth spending on youth services to develop such skills?

Few have tried to answer this last question because the economic benefits of improving social and emotional skills are dispersed and may only be clear in the long term, which makes measuring them difficult and costly. A 2013 systematic review of academic research on youth work found that only four out of 175 studies looked at the cost-effectiveness or cost-benefit of youth work. Nevertheless, as part of the Youth Investment Fund (YIF) learning project, we sought to develop a model that estimates the long-term value of open access youth services for participants and society at large. The aim was to find out whether such a model was possible given the methodological challenges.

We tested the model with outcomes data collected as part of the YIF shared evaluation (see Learning and Insight Paper 7). This data set included outcomes data from twelve grant-holders who collected baseline and three month surveys from young people and eleven grant-holders who collected baseline and six month surveys. Young people were asked to complete the outcome surveys at regular intervals, in order to track their progress in their social, emotional and learning skill development over time. The changes in skills for both groups were then compared to changes in the same skills of a similar group of young people who did not participate in such programmes. The aim of this test was to find out whether the outputs of the model were plausible.

1.2. Conclusions

1. Development of such a model was possible and facilitated by longitudinal research published in 2015 by researchers from the Institute of Education at University College London that estimated the effect of social and emotional skills of young people on their life outcomes at age 42.[1]

2. Populating the model with survey data from the YIF shared evaluation produced positive and plausible results. These were driven by significant short-term improvements in the social and emotional skills experienced by a small sample of young people that were surveyed.

But as with all economic modelling, there are a number of assumptions, caveats, and limitations that make it not advisable to extrapolate from these specific results to youth services generally. More robust data is needed to increase confidence in the replicability of these results.

1.3. Results of the model

When combined with other research funded by YIF, the results suggest that investments in high quality open access youth services can potentially generate positive financial and economic returns that accumulate over the long-term, namely, based on research by Professor Goodman, a 25 year period when the participants become 42 years old. The young people themselves are the main beneficiaries. We estimate that approximately 65% of the economic benefits we identified will accrue to the young people themselves (see Table A). This is mainly because people with higher levels of social and emotional skills have higher levels of employment and income. But we also estimate that over the 25 year period, the UK Exchequer may receive back between £3 and £13 for every £1 invested in these specific youth services. This is because higher social and emotional skills are associated with higher incomes and employment, and hence higher tax payments, and lower use of public services such as health services. Figure 1 summarises the impacts that are included in these economic benefits.

[1] Goodman, A., Joshi, H., Nasim, B., & Tyler, C. (2015). Social and emotional skills in childhood and their long-term effects on adult life. *London: Institute of Education*.

Table A: Summary of the results of the economic model: cumulative benefits over 25 year period

	3 month group	6 month group
Number of young people in cohort	181 from 12 youth organisations	79 from 11 youth organisations
Total costs for the cohort	**£113,171**	**£64,353**
Value of benefits to respondents (young people) themselves, up to age 42	£2,838,421 (65%)	£393,464 (66%)
Value of benefits to UK Exchequer, over approx. 25 years	£1,448,459 (33%)	£188,358 (31%)
Value of benefits to community through reduced crime over approx. 25 years	£83,740 (2%)	£16,953 (3%)
Total value of benefits	**£4,370,619 (100%)**	**£598,775 (100%)**
Benefit-cost ratio (all stakeholders)	39 : 1	9.3 : 1
Benefit-cost ratio for UK Exchequer and community only (i.e. excluding value to young people themselves)	13.5 : 1	3.2 : 1

1.4. Assumptions, limitations, and caveats

While these results are positive and strong, there are several important caveats:

- The model omits a number of benefits that are not easily monetizable, such as the value of improved mental and physical health to young people, which many may consider very important.
- There are a number of important assumptions that underline the model, most notably that the short-term changes in the social and emotional skills (e.g. sociability, self-confidence) of young people, identified in the survey results, are sustained over time and contribute to the long-term impacts.
- There are some concerns about the robustness and credibility of the outcome and the cost data that mean the results should not be extrapolated to all youth services. Most notably:
    - The sample size of the survey data turned out to be small due to challenges in collecting data. We are unsure whether the results are unusual or typical.
    - Due to concerns about the completeness and quality of attendance data, we made the assumption that young people would need to attend the youth service for 24 months for the changes reported by the young people to be sustained. This needs to be tested.

- The cost data is self-reported by youth organisations and not independently validated.

The results show that there is likely to be a positive return to society from investing in open access youth provision. But developing a robust estimate of this value using this model will require better data and targeted research.

1.5. Recommendations

Unlike typical ‘single-use’ models, this economic model was designed differently. It is easy to share, modify, and update. Further improvements and use would require the dissemination of the model; identifying a body to curate and promote the development and use of the open-source model; and fostering a group of interested parties to engage in such development.

Specific research that would improve confidence in the model’s results would be:

- Research on the per person cost of open access youth provision. This is currently not readily available.
- Better data on how long young people stay involved in open access youth provision.
- The extent to which the effects of youth work on social and emotional skills apply consistently to different groups of young people and are sustained over time.
- Whether the model results are similar if different tools to measure social and emotional skills are used.
- Further secondary or primary research on the effect of improved communication skills on longer-term educational and employment outcomes.

2. Introduction

This is the eighth in a series of Learning and Insight papers published as part of the learning project for the Youth Investment Fund. In this paper, we report on the findings from our work developing a model to predict the long-term economic benefits of open access youth work in England based on short-term increases in the social and emotional development of young people. We describe the purpose and design of the model and the results we obtained when the model was populated with outcomes data from a cohort of youth organisations, funded by YIF. As discussed below, the results from the model are tentative, in part because they rely on a relatively small set of outcomes data, provided by grant-holders of YIF, and cost data from the grant-holders that has not been independently validated.

This paper is a follow-on from YIF Learning and Insight Paper 2, Background to the YIF economic simulation model, which discusses economic evaluation of youth work and findings from prior economic modelling of youth projects. This paper should be read in conjunction with YIF Learning and Insight Paper 2, as it provided the background for and influenced the development of the YIF economic simulation model.

2.1. Who is this paper for?

This paper and the associated model (see Appendix 4.1) is for anyone interested in understanding how the economic value of informal and non-formal learning provision for young people in the UK can be estimated—using the YIF shared evaluation as a case study. This includes funders of youth services, policymakers, open access youth service providers and their representative bodies, researchers, and consultants. The Youth Investment Fund only covers England, but we believe that the learning from the shared evaluation is relevant across all of the UK and beyond. Our intention for each of these insight papers is to draw out reflective learning and share actionable insights.

2.2. Why is this important?

There is evidence that well-designed and well-implemented programmes can lead to positive educational, health, and social and emotional outcomes for young people.[2] But there is less evidence of the effectiveness of open access youth services where engagement is voluntary for the young person. In addition, as noted in Learning and Insight Paper 2, there have been even fewer efforts to estimate the economic value of open access youth services.

This model builds on prior efforts in three ways:

1. It predicts the **long-term economic impacts** (over approx. 25 years) of improvements in the social and emotional development of young people based on recent longitudinal research.[3]

2. It is **grounded in academic research**. The model builds on the Goodman study and is consistent with findings from many different studies on the short and long-term impacts of youth work.[4]

3. It is designed as a prototype of an **online, open and crowd-sourced economic model** that can be used, copied, and / or further developed by other economists and researchers, rather than be a wasteful, single-use model. Online, open and crowd-sourced economic models could be developed for many areas, not just youth services. Indeed, recent digital collaboration in the health sector spurred on and necessitated by the Covid-19 crisis, possibly points to a future where the sharing of models like this is common.[5]

This paper is neither the first nor the last word on the potential economic value of open access youth work. Consistent with George Box's famous observation that 'all models are wrong, some are useful,' this model provides an indicative, not precise estimate of the value of youth programmes. While it is built on the best available evidence (as far as we are aware), there are important caveats and limitations with the model and the data that are described in this paper. We hope the paper and the model promote further academic and

[2] Clarke, A. M., Morreale, S., Field, C. A., Hussein, Y., & Barry, M. M. (2015). What works in enhancing social and emotional skills development during childhood and adolescence. A review of the evidence on the effectiveness of school-based and out-of-school programmes in the UK. A report produced by the World Health Organization Collaborating Centre for Health Promotion Research, National University of Ireland Galway.
[3] Goodman, A., Joshi, H., Nasim, B., & Tyler, C. (2015). Social and emotional skills in childhood and their long-term effects on adult life. London: Institute of Education.
[4] Ibid.
[5] For example, see Moorthy, V., Restrepo, A. M. H., Preziosi, M. P., & Swaminathan, S. (2020). Data sharing for novel coronavirus (COVID-19). Bulletin of the World Health Organization, 98(3), 150.

applied research into the long-term value of investing in young people, to improve the preliminary estimates discussed below.

To contact us about getting involved in further economic analysis of the youth sector or to find out more about the YIF economic simulation model please contact David.Pritchard@thinkNPC.org and visit www.YIFLearning.org

2.3. Acknowledgements

The YIF evaluation team would like to thank The National Lottery Community Fund evaluation team and our research partners who guided the design of our economic evaluation and provided feedback on the model.

We would also like to give special thanks to our former colleague, Anoushka Kenley, who played a central role in the development of the model, and thanks to our research partners Bryson Purdon Social Research (BPSR) for their analytical support.

Finally, we would like to thank the many researchers and youth work practitioners, many of whom are unknown to us, who conducted the research and collected the data used to build this model. This includes Alissa Goodman, Professor of Economics and Director of the Centre for Longitudinal Studies, and her colleagues, and the staff and young people involved in the cohort of youth clubs that provided the data to populate the model.

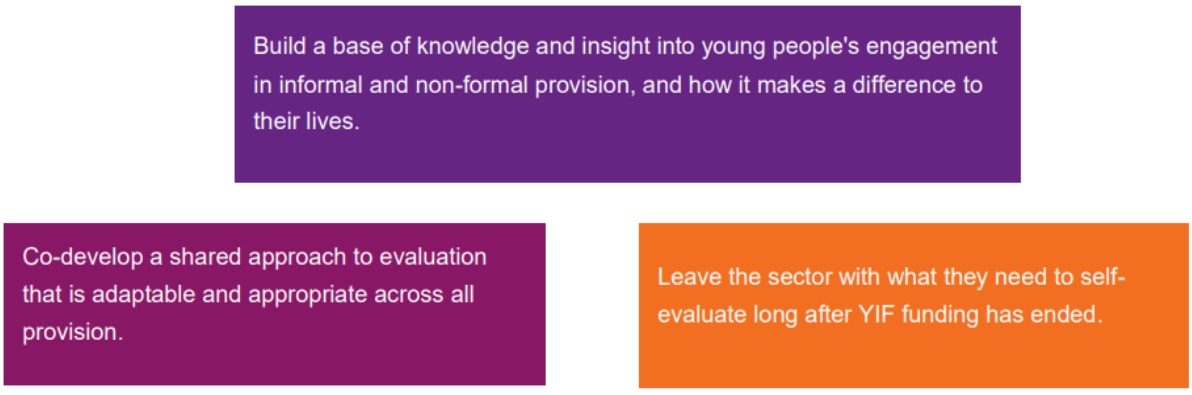
3. The Youth Investment Fund

The Youth Investment Fund (YIF) is a joint investment of £40m between the Department for Digital, Culture, Media and Sport (DCMS) and The National Lottery Community Fund, to expand the delivery of open access youth services in six regions of England, and to enable funded organisations to invest in their own development to increase the sustainability of this youth provision.[±]

The three-year programme (2017-2020) aimed to provide new opportunities for young people to get involved in their communities and to support the personal development of thousands of young people across England, building their confidence and supporting their transition to becoming happy, healthy and economically active adults.

3.1. The Youth Investment Fund learning project

As part of the investment in local voluntary and community youth organisations, the funders set up a learning and impact project, led by New Philanthropy Capital (NPC) in partnership with the Centre for Youth Impact and a wider consortium of research partners. The learning project commenced in May 2017 and is due to be completed in May 2021. It aims to:



[±] The six regional areas that received three-year funding from the Youth Investment Fund in 2017 were East London, Liverpool City Region, West Midlands, Tees Valley and Sunderland, Bristol and Somerset, and Eastern Counties.

3.2. Simulating the economic impacts of open access youth work

To date, there have been few attempts to make robust estimates of the economic impacts of the long-term effects of open access youth work - for good reason[6]

First, estimating the long-term impact of any social programme or intervention is prone to error, as it is difficult to isolate the influence of the programme from the multitude of other factors that influence life outcomes. Without longitudinal data on the long-term effects of youth work—which takes years to collect—estimating economic impacts involves projecting the effects of the programmes on participants many years into the future.

What do we mean by simulation?

Simulating economic benefits means estimating economic impacts (past, current, or future) using a model of expected behaviour.

Secondly, it is costly to do well because:

- There are different types and designs of open access youth services with different levels of quality. Estimating the economic impact of youth services in general requires collecting data from different services to reflect these differences.
- It takes resources and time to collect outcomes surveys over a period of time with the same young people and to match this to their level of engagement (frequency) and intensity of support (dosage) received. YIF Learning and Insight Paper 7 describes the practical challenges of doing this.
- By design and definition, the degree of participation is variable and unpredictable, due to the informal and voluntary nature of youth engagement. Tracking participation robustly requires a level of effort that is hard to justify for individual youth organisations. This is the experience of YIF.

[6] For example, a 2013 systematic review (Dickson, K., Vigurs, C., & Newman, M. (2013). Youth Work: A Systematic Review of the Literature (Rep.). Dublin, Ireland: Department of Children and Youth Affairs) of academic research on youth work found that only four out of 175 studies looked at the cost-effectiveness or cost-benefit of youth work. See also Learning and Insight Paper 2.

- It is difficult to isolate young people's engagement with other types of statutory or non-statutory support services for young people.
- It involves finding a sample of comparable young people who do not access open access youth provision and tracking their outcomes over time as well.

Thirdly, there are many ways that participating in youth services may create value for both the young people themselves and society in general. A comprehensive analysis would take a lot of time and resources, while focusing on a few impacts is likely to underestimate the true value of the services.

YIF provided an opportunity to address these reasons and the challenges they present by:

- providing access to a variety of different types of open access youth services serving different types of young people;
- identifying organisations willing to conduct surveys of young people;
- providing funding to survey a comparator group of young people to create a robust counterfactual; and
- supporting the use of existing research on the relationship between young people's short-term social and emotional learning skills and their long-term outcomes and impacts.

These enabled us to develop a model of the likely most significant economic impacts of open access youth provision. However, it is not yet a comprehensive model and there are notable omissions that could be looked at in the future.

The rest of the paper discusses the design of the model, notes key research papers used in developing the model (the appendix includes a full bibliography), and shows the results we obtained when we inputted outcome data from a cohort of YIF funded open access youth organisations. The paper ends with conclusions about the process of developing the model and recommendations on how the model can be used and further developed.

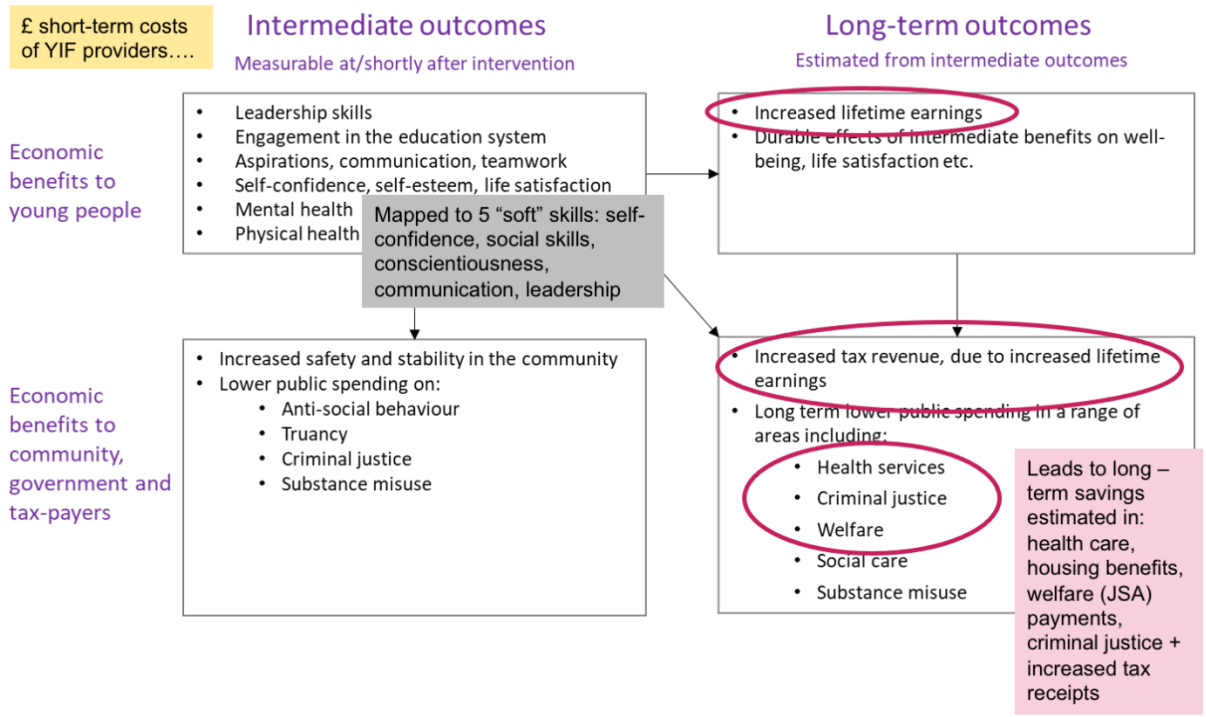
3.3. Model design

The main elements of the model are described below. The model includes more information on the design and allows the model, and the underlying evidence behind it, to be directly viewed (See Appendix 4.1).

3.3.1. Linking social and emotional characteristics of young people to economic impacts

The central element of the model is the link between changes in the social and emotional development of young people who participate in open access youth services and the longer-term economic impacts. Informed by the YIF theory of change and research, Figure 1 maps the most significant intermediate social and emotional outcomes that youth organisations expect to influence to long-term impacts for both the young people themselves and society at large. In the model, the intermediate outcomes from the YIF theory of change are grouped into five outcomes or 'soft' skills that reflect both the theory of change and are common in academic research on the social and emotional development of young people. The long-term impacts that were converted into monetary values are circled red in Figure 1.

Figure 1: How intermediate outcomes supported by youth work link to long-term economic benefits



Thus, the model estimates the following economic impacts:

- For young people themselves:
    - The value of increased earnings over their lifetime.
- For the UK Exchequer:
    - Increased tax revenue from those increased earnings.

    - Reduced public expenditure resulting from improved health, reduced welfare payments (namely housing benefits and job seekers allowance benefits), and reduced expenditure on crime.

- For the community:

    - Reduced costs resulting from reduced crime.

The value of improved physical and mental health and educational attainment of young people over time is excluded except to the extent that these indirectly support increased lifetime income. This is a result of us prioritising estimating economic benefits to society as a whole, over the value to young people themselves.[7] We suggest that the model can be improved in this way in the future.

The model covers the period from when the young people are surveyed (for YIF this was between March 2019 and March 2020) up to age 42, though this age can be reduced or increased by the users of the model. This age was chosen to correspond to the main piece of research that was used to build the model, as discussed below.

3.3.2. Model structure

The structure of the model is shown in Figure 2. Users enter the number, ages and gender (if available) of the cohort of young people who participate in the youth organisation's activities, and quantitative scores that represent changes in the five social and emotional outcomes noted above ('soft' skills / outcomes). The model converts the quantitative scores to effect sizes (see the text box below) for the next step.

[7] By contrast, the Housing Association Charitable Trust (HACT) social value bank estimates the intrinsic value to participants of going to a youth club.

What is an 'effect size'?

An effect size is a standardised measure of how effective a programme is in bringing about change. It is the number of standard deviations that the programme moves the average score of the participant group by. It is calculated by first finding the difference between the average score of the participant (or intervention) group and the average score of a comparator or control group, and dividing that by the standard deviation of these two groups combined. For example, if the average score of the participant group was 60, the average score of the comparator group was 55, and the standard deviation of the combined groups was 20, the effect size would be 0.25, or (60-55)/20.

In a normal bell curve (e.g. an IQ test), approximately 33% of the scores fall between the average and plus one standard deviation. Thus, a programme that has an effect size of 1 moves the average score of the participant group up to the score of the person at the cut-off of the top 17% of the comparator group.

The advantage of an effect size is it allows the effectiveness of different programmes to be compared without having to know the underlying units, similar to how a percentage change gives a sense of the scale of change without knowing the underlying unit.

The use of effect sizes:

- Allows users to provide quantitative scores from any reliable measure of the outcomes (such as a standardised and validated measurement tool) as long as the standard deviation is also provided. This ability to accept any valid score of the outcomes increases the usability of the model.
- Allowed us to use longitudinal research undertaken by researchers at the University College London on the impact of young people's social and emotional skills on long-term outcomes and impacts. This research provides effect sizes of the different outcomes on those long-term impacts.

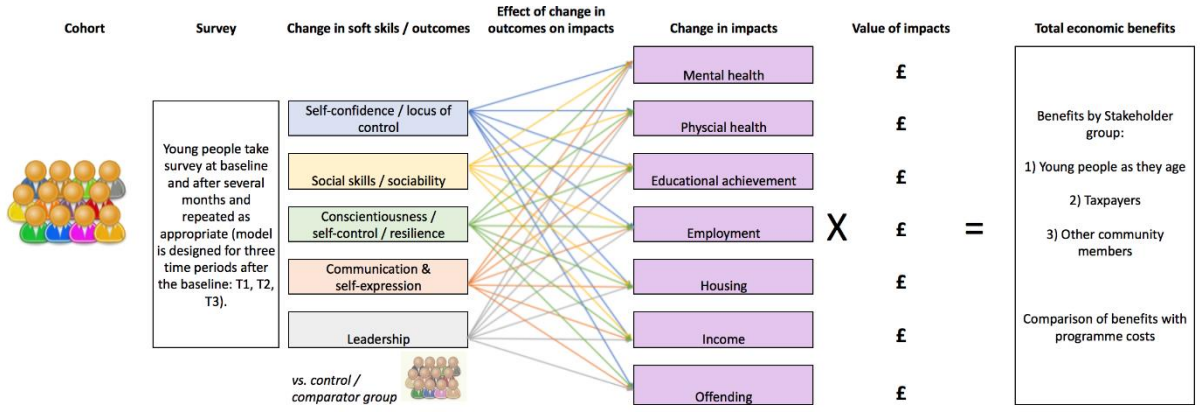
For each of these outcomes, the model multiplies the effect sizes by the factors or coefficients identified in the research mentioned above (see Appendix 2) to estimate the impacts on the seven impacts shown in Figure 2.[8] The coefficients are independent of each

[8] A coefficient is simply a multiple. The coefficients of 2X, 6Y, and 3.5X, are 2, 6, and 3.5 respectively.

other. This avoids double counting.[9] The model is designed to allow each of the five 'soft' skills to influence each of the seven impacts (i.e. 35 pairs of 'soft' skills and impacts). As shown in Appendix 2, our research identified appropriate coefficients for 28 of these pairs. We did not find quantitative evidence that links communication and self-expression to the seven impacts, and only one appropriate quantitative study that linked leadership to any of the impacts (income). One of the unique features of the model, is that it can be updated if relevant research emerges.

Each impact is given a monetary value based on a separate analysis (see Appendix 3). The values are then aggregated according to whether the economic benefits accrue to the young people themselves, the UK Exchequer (HM Exchequer), or the community at large.

Figure 2: Model structure



3.3.3. Data required from users

The model can be used to simulate economic impacts for a cohort of young people from a single youth service or a cohort of youth organisations, and has the potential to be used with a larger population, as long as the following data is available:

1. number, age and gender of a cohort of young people;
2. the cost of the youth organisation or, if more than one, the cohort of youth organisations;

[9] The coefficients come from the Goodman study, discussed above and below. In that study, all the social and emotional skills (and additional controls) were included in a multi-variate regression to try to isolate the effect of each skill. See Goodman, 2015, p.48.

3. the changes in quantitative scores of the five social and emotional outcomes described in the first column of Table 2, preferably based on a standardised measurement tool, though not necessarily the items in the second column of Table 2;
4. the standard deviation of the quantitative scores for social and emotional outcomes; and
5. the period of participation (e.g. six months, one year, two years etc.) in open access youth services needed to lead to the changes noted above in point 3.

As noted above, the scores can be in any form as the model converts raw scores to effect sizes (hence the requirement for users to include standard deviations) to estimate the impacts.

Users can input actual or estimated figures for these five sets of data. Actual figures will give the most accurate estimates, but the model can be used to predict what the impacts would be under different hypothetical scenarios, when, for example, planning or making a prospective business case.

As an option, users can enter expected or actual changes in five social and emotional outcomes of a control or comparator group to provide a more robust estimate of impact that takes the counterfactual into account. Our testing of the model described below included a comparator group which makes the findings from this model more robust than other analyses that only consider outcomes for the participant group, such as the models described in Learning and Insight Paper 2.

3.3.4. Research and evidence used

The four key groups of research and evidence used to build and populate the model are described in Table 1.

Table 1: Types of secondary evidence used in the model

Research	Used to	Source
2015 paper by Professor Alissa Goodman and colleagues entitled 'Social and emotional skills in childhood and their long-term effects on adult life.'	Estimate the effect of changes in social and emotional skills on economic impacts. The paper compares social and emotional skills of children and young people to a set of outcomes, including employment, income, and educational attainment, at age 42.	See Appendix 2 for the coefficients used, and Appendix 4 for the Bibliography.
Collection of papers on the role that social and emotional skills play in young people's development and life outcomes.	Provide both support and a check to the estimates taken from the Goodman paper.	
Data on the seven impacts covered by the model, taken from academic and government sources.	Estimate the value of the seven impacts used in the model. For example, weekly earnings data from the Annual Survey of Hours and Earnings (ASHE) were used to estimate the value of the increase in income over time.	See Appendix 3 for the values used in the model. The underlying sources and calculations are in the online model.
Data on the changes in social and emotional skills and the costs of providing open access youth services.	Populate the model, as described above.	Data collected by a cohort of YIF open access youth providers.

3.4. Model assumptions and limitations

Like all models, this simulation model uses a number of estimates and assumptions. The sources of the estimates are noted in the relevant sections of the model and represent the prevailing view of evidence. The model was developed:

1. to be consistent with HM Treasury, The Green Book: Central Government Guidance on Appraisal and Evaluation;

2. by selecting, when a choice between different sources of evidence had to be made, studies that were most robust, based on the UK population, most widely cited, consistent with other studies on the topic, and consistent with the overall methodology of the model;

3. to be easy to update with new and better evidence and data.

While the use of multiple sources of evidence ensures the model is grounded in corroborating evidence, there is a risk in taking data from studies that were conducted at one place and time for one group of people and applying the results to another group at a different place and time. The conditions in place for one study can never be replicated or controlled for, and it is highly unlikely that the results from one study will be exactly replicated when applied in another setting. This model rests on the key assumption that the results from the Goodman study, in particular, apply to the young people who participated in the YIF outcomes data collection. The most significant assumptions are:

- Young people's social and emotional skills cause, rather than are simply correlated to, long-term impacts. The links found in the Goodman study show a strong correlation between these but do not necessarily show these skills cause the impacts. The research is by no means settled, and there may be other reasons for the strong correlation. For example, positive social and emotional skills and long-term outcomes may both be consequences of other personal characteristics such as motivation and determination. However, we believe the cumulative evidence provided by all sources warrants this assumption of causation.

- Changes in young people's social and emotional skills lead to proportionate and linear improvements in long-term impacts. This is a more subtle assumption than the one above but is significant as it goes beyond the findings of the Goodman study. Even if X causes Y, that may not necessarily mean changes in X lead to changes in Y in a constant and linear fashion. This is a simplifying but necessary assumption, as it is difficult to test.

- The measures of the outcomes used in the YIF outcomes survey have the same effect as measures of the same outcomes used in the evidence that underlies the model, especially the Goodman study. Allowing for different measures of the outcomes makes the model more usable, but assumes that the measures of the outcomes are equivalent to each other, which may not hold up in practice.

- The young people would need to attend the youth service for 24 months for the changes reported by the young people after three and six months to be sustained. This assumption is further discussed below.

Besides relying on these assumptions, there are other limitations to the use of the model:

- There are likely benefits from participating in youth clubs that are excluded from this model. For example, as noted above, the model omits a number of benefits that are not easily monetizable, such as the value of improved mental and physical health to young people.
- The value of the impacts (see Appendix 3) were calculated specifically for this model using available data. These have not been independently validated.
- There is unavoidable uncertainty in the model, not least because it tries to predict the future.

Finally, there are assumptions and limitations with the YIF outcomes survey data used to populate the model. These are discussed following the findings.

3.5. Findings from testing the model

Of a total of 83 YIF grant-holders who submitted eligible and useable data as part of the YIF shared evaluation between July 2018 and August 2020, a total of 56,783 young people were recorded as having attended YIF funded provision. We intentionally set out to collect outcomes data from a sub-set of grant-holders over the course of a 12 month period (March 2019 to March 2020) and worked with 39 organisations to do so. However, due to the time intervals between outcomes surveys being different to the comparison group (i.e. at approximately three or six month intervals) and some of the surveys having missing data, the number of completed useable surveys was much lower than hoped for (see Learning and Insight Paper 7).

In summary, we tested the model with data from a cohort of 16 individual youth organisations; of whom, 12 completed baseline and three month surveys and 11 completed baseline and six month surveys. Total survey responses from each of the two groups were:

- 181 young people (129 males, 51 females and 1 don't know) who completed the survey three months after their baseline survey (three month group); and
- a separate group of 79 young people (50 males and 29 females) who completed the survey six months after their baseline survey (six month group).

We then added in the comparator group sample (which allowed for a difference-in-difference comparison) which were 632 and 581 individual responses for the three month group and six month group respectively. The findings below are provided separately for these two groups. Data on the costs of service delivery, provided by each of the 16 YIF grant-holders, was also added into the model. The cost data was self-reported by grant-holders in their annual budget reports to the NLCF, and not independently validated.

This test provided findings on both the process of using the model and the results. These are discussed in turn below.

3.5.1. Using the model

The main finding was that populating the model worked as expected and confirmed that such a model, while ambitious, is feasible. There were a few minor issues identified in the process of populating the model:

- The YIF surveys provided a single score for each outcome. For outcomes that have more than one item, the average scores of the relevant items were used as the single score.
- Statistical testing of the YIF survey results identified some minor issues with three items from the YIF outcomes survey, which were then dropped from the analysis (see questions highlighted in bold in Table 2).
- While the model was designed to allow calculation of effect sizes from the raw scores from the two groups and their comparators, it was more convenient to make these calculations in a separate spreadsheet (see Table 3 for the effect sizes).
- Similarly, the model was designed to compute per participant costs based on the standard YIF annual budget (cost) reporting form used by grant-holders to report to NLCF. However, the 16 youth organisations provided the cost data in slightly different formats and so the calculations of per participant costs were conducted outside the model.

While these are minor issues, they suggest that the model cannot easily be used by novices to economic modelling. The model can be made available for others to build on, but estimating impacts should be restricted to people who are familiar with conducting economic models and statistics so they can make any refinements to the model as appropriate.

Table 1: Map of the YIF outcomes survey items to social and emotional skills covered in the model

Social and emotional skill / outcome	Relevant questions from the YIF outcomes survey
Self-confidence / locus of control	Q5 Item 1: I am confident that I have the ability to succeed in anything I want to do Item 2: I can handle things no matter what happens **Item 3: My life is mostly controlled by external things: Responses were inconsistent with respondent's responses to the other items about locus of control (such as Item 4 below) and so this item was deleted** Item 4: My own efforts and actions are what will determine my future **Q2:** **Item 1: I have a lot to be proud of: There was only a weak association with the other survey items so was deleted as it contributed little to measuring the outcome**
Social skills	Q3 Item 3.1: Having a go at things that are new to me Item 3.2. Working with other people in a team Item 3.3. Meeting new people Item 3.8. Dealing with conflict with / between friends Item 3.9. Being in large groups of people
Conscientiousness / self-control / resilience	Q3 Item 3.7. Getting things done on time Q4 **Item 4: I've been dealing with problems well: This was excluded as it was considered inappropriate to separate it from the rest of the** Short Warwick-Edinburgh Well-being Scale**, the source scale** Q5 Item 5: I can stay calm in stressful situations
Communication and self-expression	Q3 Item 3.4. Putting forward my ideas Item 3.6. Explaining my ideas clearly Item 3.10. Standing up for myself without putting others down
Leadership	Q3 Item 3.5. Being the leader of a team

3.5.2. How the YIF outcomes survey data was incorporated into the model

Table 3 below shows the effect sizes and p-values for each of the five social and emotional skills (SEL) and by gender.[10] The reason for separating by gender is to allow for the different effects of youth services on SEL skills as well as SEL skills on impact by gender. Currently, the model includes only one difference: higher sociability of boys is associated with lower educational attainment, but the same is not true for girls. In the future, the model can be adjusted to incorporate any new research that shows differences by gender.

[10] The p-value is the probability of an observed difference being due to chance, rather than being a real underlying difference between the two groups. A p-value of less than five percent is conventionally taken to indicate a statistically significant difference ($p<0.05$).

In Learning and Insight Paper 7 we did not separate the outcomes from the YIF survey by gender because doing so made the sample sizes smaller and the reduced statistical significance. The purpose of separating by gender for this model was to test the model rather than to maximize statistical significance. Separating by gender did reduce statistical significance and, as a consequence, the estimated economic impacts as described below.

Only effect sizes that were statistically significant were included in the model, to minimize, though not eradicate, one source of uncertainty in the estimate of economic impacts.[11] As shown in Tables 3 and 4, out of the ten effect sizes (i.e. one effect size for five SEL skills for males and females) eight were statistically significant for the three month group whereas only four were statistically significant for the six month group. The effect sizes are not that different for males, between the two time periods, but are very different for females. This is largely due to the small sample of females in the six month group.

The results raise the question as to whether large short-term improvements in the SEL skills at three months are likely to be sustained. The expected pattern is of a short-term boost to an outcome that then starts to fade with time, which is common for many interventions. We did not have survey data from the same young people completing baseline, three months and six months surveys to test for this. We do know however, that the young people in both the three month and six month groups were largely not new to provision. Many had started attending the youth organisation several months prior to their baseline survey, but for the majority, their registration dates were missing from the data, so we simply do not know when they started (see Learning and Insight Paper 7). For our economic model testing, we were reluctant to assume that it only takes respectively three and six months for young people to achieve sustainable improvements in their social and emotional skills. Instead, we built in an assumption that the young people would attend a youth organisation for 24 months (which would in turn reflect the costs of their participation) and the changes reported by the young people after three and six months would be sustained if they attended the youth service for this long.[12] The choice of 24 months is to be conservative in the cost-benefit analysis If the length of participation is halved, the benefit-cost ratio doubles. In reality, duration of attendance can vary greatly for each individual young person from a couple of days to many years. Our estimate was informed by advice from our YIF grant-holder co-design advisory

[11] An effect size (or any other measure) is statistically significant if its value is unlikely to be due simply to chance, as shown by a statistical test. Tossing a coin four times and getting three heads is not statistically significant proof that the coin is biased, but tossing the coin 400 times and getting 300 heads is statistically significant proof as this is highly unlikely to happen due to chance.

[12] This time period was agreed upon in partnership with our YIF grant-holder co-design advisory group.

group and information on three month survey respondents' attendance at their youth provision prior to their baseline data being collected (ranging from 1 month to 21 months).

Note also that for both the three month and the six month group, there were statistically significant effect sizes on the communication and leadership skills of young people. But as noted above in the discussion of the model structure, we found no quantitative evidence that links communication and self-expression to the seven impacts. We only found a link between leaderships skills and education. This means improvements in communication and leadership have no or little impact on the model results, and this will underestimate the impacts of the YIF youth organisations. The model can be updated if robust evidence on the effects of these two outcomes emerges. The combination of these factors (low levels of statistical significance for the six month group and a lack of evidence connecting communication skills in particular to long-term impacts) on the coefficients led to the results of the economic estimates that are shown in Table 5. For the six month group, the results are driven almost completely by changes in the sociability of males.

Table 2: Effect sizes and p-values

Social and emotional skills (SEL)		Effect size - 3 month group	p-value	Effect size - 6 month group	p-value
Self-confidence / locus	Male	**0.32**	**0.01**	0.35	0.186
	Female	-0.13	0.864	0.01	0.591
Social skills	Male	**0.54**	**<0.001**	**0.51**	**0.019**
	Female	**0.41**	**0.004**	-0.18	0.397
Conscientiousness / resilience	Male	**0.41**	**0.02**	0.34	0.406
	Female	0.01	0.884	-0.32	0.273
Communication	Male	**0.53**	**<.001**	**0.49**	**0.022**
	Female	**0.34**	**0.016**	0.00	0.78
Leadership	Male	**0.47**	**0.022**	**0.41**	**0.065**
	Female	**0.46**	**0.002**	**-0.05**	**0.04**

Results in bold are statistically significant at a 95% confidence level (i.e. the effect sizes in bold are very likely to be greater than zero).

Tables 4 and 5 note the main differences between the three month and six month groups besides the effect sizes noted above. For both groups, the long-term impacts are included up to age 42. This was the age of the cohort used in the Goodman study when data on their impacts was collected.

Table 3: Differences between the three month and six month outcomes survey groups

	3 month group	6 month group
Number of survey respondents[13]	181	79
Average cost of youth service per respondent per year	£313	£407
Estimate of the length of engagement (duration) per respondent	24 months	24 months
Number of statistically significant improvements in 'soft' skills (out of 10)	8	4
Period over which long-term benefits are estimated	Up to age 42	Up to age 42

Table 4: Social and emotional skills that influence the economic impacts

	3 month group						6 month group					
	Mental health	Physical health	Ed. attainment	Employment	Income	Offending	Mental health	Physical health	Ed. attainment	Employment	Income	Offending
Self-confidence / locus of control	Male only	Male only	Male only	Male only	Male only	Male only						
Sociability	✓	✓	✓	✓	✓	✓	Male only	Male only	Male only	Male only	Male only	Male only
Conscientiousness	✓	✓	✓	✓	✓	✓						
Communication												
Leadership					✓						✓	

3.5.3. Results

Table 6 shows the summary results of simulating the economic impacts of the two groups. As there are a number of caveats and limitations with the data —see above—, these results should be considered indicative, not conclusive. The analysis would need to be repeated with new data and be further tested before strong claims are made about the long-term economic impacts of youth work.

Nonetheless, the results suggest that:

- Young people benefit economically from participating in open access youth services.

[13] Our analysis of the three- and six-month impacts largely involve separate pools of YIF respondents (see Learning and Insight Paper 7, pp. 63-63).

- The estimated total benefit-cost ratios of youth organisations can be high. This is because:
    - the change in outcomes can be large (i.e. the effect sizes were high);
    - the economic benefits are tracked over a long period (up to age 42) while the costs are only incurred for a few years; and
    - the significant changes in SEL skills seem to appear within only a few months between the baseline and the follow on surveys, a much shorter period than we would expect. Although the change in SEL skills did not remain statistically significant across all outcomes at six months (it did so for four out of ten outcome-gender pairs), there was still a positive change at this time-point. For males, the changes seem to be sustained over six months, although the reduction in sample size means that some of these results become not statistically significant. The number of females is very small at six months so the results are not robust.
- The benefit-cost ratios that only consider the value to the UK Exchequer and society at large may also be high, though arguably not excessive considering the period benefits are accrued.
- The large difference in the benefit-cost ratios between the two groups shows that the results from this model are sensitive to the inputs. The two groups differ primarily in:
    - the difference in the costs (£313 vs £407) per participant per year, which largely reflects the number of survey respondents from different youth organisations. The six month group had more respondents from slightly higher costing services.
    - differences in the number of effect sizes that were statistically significant combined with the absence of evidence on the impact of communication skills. There were fewer effects included in the model for the six month group in large part because the number of respondents was low (see Table 5).

The main factor influencing the ratio is the large effect on predicted income of YIF participants. For the three month group, this amounts to £2.8m out of the total £4.4m value (approx. 65%). Each of the outcomes, self-confidence, sociability etc., will increase income independently. Based on the changes in social and emotional skills described above, those increases add up to about a £1,100 per person increase in annual income (4% above

median income) each year (for males) until age 42. For 129 males over a period of 25 years, this adds up to a large sum.

Table 5: Summary of results of the economic simulation

	3 month group	6 month group
Total costs for the cohort	**£113,171**	**£64,353**
Value of benefits to respondents (young people) themselves	£2,838,421	£393,464
Value of benefits to UK Exchequer	£1,448,459	£188,358
Value of benefits to community through reduced crime	£83,740	£16,953
Total value of benefits	**£4,370,619**	**£598,775**
Benefit-cost ratio (all stakeholders)	39 : 1	9.3 : 1
Benefit-cost ratio for UK Exchequer and community only (i.e. excluding value to young people themselves)	13.5 : 1	3.2 : 1

As a point of comparison, the 2018 evaluation of National Citizen Service estimated a benefit-cost ratio of 3.49 and 3.45 for the summer and autumn programmes respectively. There are a number of differences in the models. One of which is the NCS estimate was based in part on the estimated impact on lifetime earnings (via improved leadership) whereas the YIF model stops estimating increased income at age 42.[14]

However, there are a number of reasons to be cautious with the results in the table. First, the effect sizes are large given the short period between the baseline survey and the follow on survey. It seems unlikely that large changes would take place in such a short period with a larger cohort. This is not an issue with the model as such, but with the outcome data that is inputted into the model. Learning and Insight Paper 7 discusses the caveats with the outcomes data, and the relatively small sample size suggests it is inappropriate to extrapolate the findings from these results to all youth organisations supported by YIF. As shown in Table 3, the effect sizes range from 0.01 (small effect) up to about 0.5 (large effect), with most outcomes reporting an effect size of between 0.3-0.4 (medium effect). The Goodman study notes that 'typically, effect sizes are considered large if they are greater than 0.1' but such large effect sizes are not unknown.[15] A 2010 meta-analysis of youth programmes found effect sizes of between 0.1-0.4.[16]

[14] Dokal, B., McGee, A., Mckay, E., Fitzpatrick, A., Hodson, E., Matthews, P., Nickson, T., Bates, J., Miller, J., Conlon, G. (2019). National Citizen Service 2018 Evaluation (Rep.). London: HM Department for Digital, Culture, Media and Sport. Retrieved 9 January 2021 from: www.gov.uk/government/publications/national-citizen-service-evaluation-report-2018.

[15] Goodman, A., Joshi, H., Nasim, B., & Tyler, C. (2015). Social and emotional skills in childhood and their long-term effects on adult life. London: Institute of Education.

[16] Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. American journal of community psychology, 45(3), 294-309.

It may be that the YIF survey respondents are self-selected young people who got the most out of the youth organisations, who were more regular and reliable participants, and who were sufficiently motivated to complete the survey twice. It may also be that in the first three and six month results, the participants experience a short-term boost in skills either from joining the open access youth service or participating in new activities and that these fade a few months later. We do not know for sure, but the results suggest that further research over a longer time period would be useful.

Secondly, we needed to estimate how long the young people had been participating in the youth organisations, as this data was not fully completed by the cohort who participated in the outcomes survey. Further research on this would also be useful.

In addition, there are assumptions built into the model and limitations discussed above that add uncertainty to the results.

We also know the model does not include some impacts and therefore may underestimate the true impacts of open access youth provision. As noted above, other than higher income, the model does not include benefits to participating in youth services that pertain to the young people themselves. These may be significant. Also, we did not find robust evidence on the impact of communications skills on long-term impacts so the improved skills from the YIF survey are not represented in the results.

These caveats and uncertainties suggest that the results should not be simply taken at face value, but equally they suggest that investing in organisations that support young people's social and emotional development does have substantial economic value.

3.5.4. Sensitivity analysis

There are several ways of testing how sensitive the model results are to changes in underlying assumptions and estimates. For example:

- It is possible to include in the survey results the number of participants who did not respond to the survey, and assume that they did not benefit at all from participating, in order to deal with the possible selection bias noted above. This would reduce the impacts from the survey significantly.
- We considered adding a new variable to 'fade' the impacts in the first few years assuming that the changes experienced by the young people are not sustainable. However, this would contradict the results of the Goodman study on which the model was built. It would also contradict results from our qualitative process evaluation, where

young people who had engaged with open access youth provision for a number of years reported that the impact of provision on their lives increases over time, particularly as they reach adulthood.

- It might be appropriate to add a 'percentage attribution' variable, to adjust the results according to estimates of how much the results found in the Goodman study were caused by, rather than simply correlated with, improvements in young people's social and emotional skills. There is no available evidence on which to base estimates of what this would be.

- Another option would be simply to reduce the number of years for which the economic benefits are calculated. This model is designed to allow this, but again, this would not be consistent with the findings from the Goodman study.

We did not undertake sensitivity testing for the cohorts because we are aware that the results would range from very low to very high and at this point would not be very informative. We believe the model parameters should be narrowed using evidence before a sensitivity analysis is considered useful.

3.6. Conclusions

Through the YIF learning project, we have:

- developed a (complicated but transparent) prototype model that links primary data (survey data and cost data) to secondary data (primarily UK longitudinal data) to estimate long-term economic impacts of youth work.

- populated the model with a modest set of survey (primary) data on a selected set of social and emotional outcomes of young people.

- estimated economic impacts based on the YIF outcomes survey data. These are high estimates because: 1) the change in outcomes was large (the effect sizes were high); 2) the long-time period over which impacts are predicted. But the results are still plausible.

- explored ideas on how to build on / improve the model, and / or make it available to other people to build on / improve.

The model shows that investments in youth work may provide a positive, possibly very positive, return to society over the long term. However, we cannot conclude this from the model as it currently stands, as there are important limitations to the model:

- it omits a number of benefits that are not easily monetizable (e.g. value of improved mental and physical health to young people).
- there are a number of important assumptions that underlie the model, most notably short-term changes in the YIF outcomes (sociability, self-confidence etc.) are sustained over time and contribute to the long-term impacts in a similar way to that found by Goodman et al using UK longitudinal data.
- In addition to the limitations of the model itself, the robustness and credibility of the model results are limited by the robustness and credibility of the outcomes and the cost data. The key limitations are:
    - as the sample size of the survey data turned out to be small due to challenges in collecting data, the results have limited external validity (i.e. cannot be extrapolated to all YIF funded organisations or to all open access youth services, or used to compare providers at present).
    - the outcomes data does not account for differences in dosage and quality of an organisation's provision.
    - the cost data is self-reported and not independently validated.

In summary, we believe the development and testing of the model shows the possibility of a positive long-term return to society from investing in open access youth provision. Developing a robust estimate of this value using this model will require better data and targeted research.

3.7. Recommendations

We have two sets of recommendations:

3.7.1. Use of the model

The YIF economic simulation model as it stands can be used to provide an indicative estimate of the value of open access youth work if it is populated with robust data. Typically models like this are used only once and then put aside, even if the results may be quoted in other research. This model was designed differently. It can be easily shared, modified, and updated by researchers or economists. Allowing the model to be accessible to other researchers and economists would enable, but not guarantee, further improvements and use. This would require: disseminating the model; identifying a body to curate and promote

the development and use of the open-source model; and fostering a group of interested parties to engage in such development[17].

3.7.2. Targeted research

There are specific pieces of data that would improve confidence in the model's results:

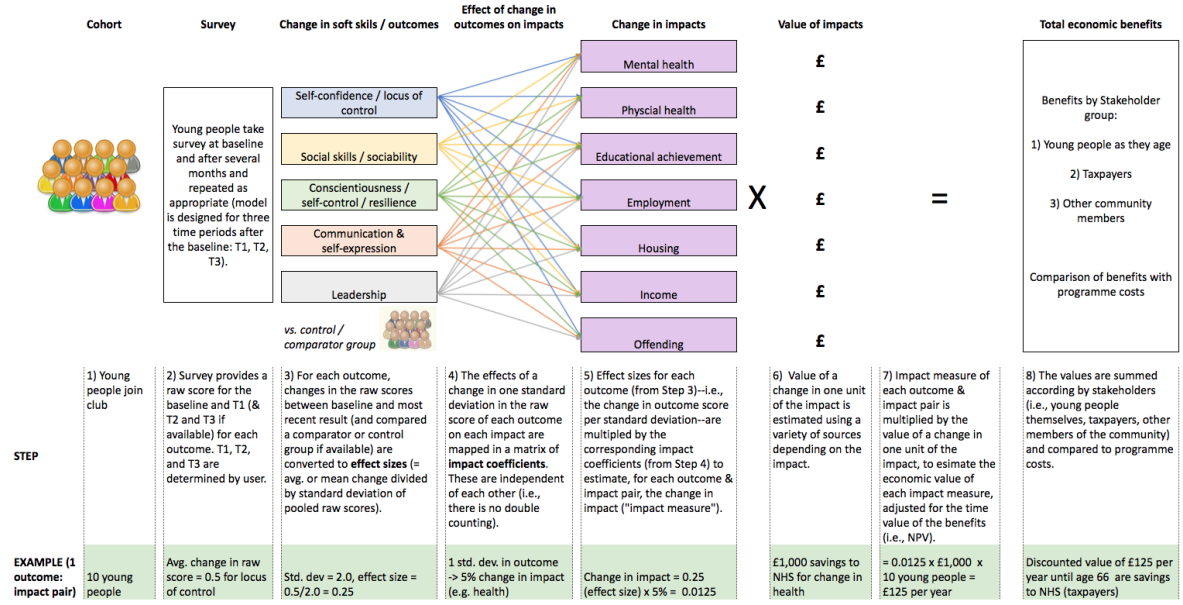
- research on the per person cost of open access youth provision. Surprisingly, this is not readily available.
- better data on how long young people stay involved in open access youth provision.
- the extent to which the effects of youth work on social and emotional skills apply consistently to different groups of young people and are sustained over time.
- whether the model results are similar if different tools to measure social and emotional skills are used.
- further secondary or primary research on the effect of improving communication skills.

[17] During 2021, NPC will be looking at open-source options for the model and we welcome expressions of interest. Email: david.pritchard@thinknpc.org.

4. Appendix

4.1. Appendix 1: The model

The figure below shows the structure of the model and a step by step guide of how the calculations are made, with examples.



4.2. Appendix 2: Coefficients and their sources

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Mental health						
Self-confidence / locus of control	Goodman, 2015	Self-reported malaise at age 42 in British Cohort Study (1970) using 9-item scale.	Locus of control	-0.048	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
	Goodman, 2015		Self-esteem	-0.056	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015		Social skills	-0.036	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015		Conscientiousness	-0.024	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	None found	N/A	N/A	0	N/A	
Physical health						
Self-confidence / locus of control	Goodman, 2015	Self-reported "Poor" health at age 42 using a 5-point scale in British Cohort Study (1970) .	External locus of control	-0.9	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015		Self-esteem	-1.5	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015		Sociability	-1.4	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015		Conscientiousness (boys only)	-0.9	Percentage points*	Includes controls for child, parent, and family characteristics, and education. Result is not statistically significant.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	None found	N/A	N/A	0	N/A	
Educational attainment						
Self-confidence / locus of control	Goodman, 2015	Self-reported educated at degree level by age 42 in British Cohort Survey (1970).	Internal locus of control	3.0	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015		Self-esteem	-0.6	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015		Low sociability (boys only)	-1.0	Percentage points	Includes controls for child, parent, and family characteristics, and education.

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Conscientiousness / resilience / self-control	Goodman, 2015		Conscientiousness	4.0	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Communications / self-expression	None found	N/A	N/A	0.0	N/A	
Leadership	None found	N/A	N/A	0.0	N/A	
Employment						
Self-confidence / locus of control	Goodman, 2015	Self-reported in employment at aged 42 from the British Cohort Survey (1970)	Locus of control	0.45	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015		Self-esteem	-0.1	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015		Sociability	0.025	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015		Conscientiousness	1.95	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	None found	N/A	N/A	0	N/A	
Income						
Self-confidence / locus of control	Goodman, 2015	Self-reported gross wages (if in employment) at age 42 reported in the British Cohort Survey (1970).	Locus of control	2.8	Percent	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015		Self-esteem	2.2	Percent*	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015		Sociability	3.6	Percent	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015		Conscientiousness	3.2	Percent	Includes controls for child, parent, and family characteristics, and education.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	Kuhn, 2005	Self-reported wages, 11 years after completing high school in the US	Leadership skills (self-reported)	2.1	Percent	US study of white men only to avoid confounding effects of gender and race (and discrimination). This effect applies to non-managerial occupations, and is higher if managerial occupations are included (page 25, Table 10).
Living in social housing						
Self-confidence / locus of control	Goodman, 2015	In social housing	Locus of control	-0.5	Percentage points (not statistically significant)	Includes controls for child, parent, and family characteristics, and education.

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Self-confidence / locus of control	Goodman, 2015	In social housing	Self-esteem	-0.05	Percentage points (not statistically significant)	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015	In social housing	Sociability (high income children only)	-0.8	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	In social housing	Conscientiousness	-1.6	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	None found	N/A	N/A	0	N/A	
Risk of offending						
Self-esteem	Goodman, 2015	Various variables from literature review, but not studied directly in British Cohort Survey (1970).	Self-esteem	0	N/A	The evidence is mixed. Evidence from New Zealand shows adolescents with low self-esteem commit more crimes as adults than those with high self-esteem. But other studies show the association between self-esteem and violent offending is not statistically significant when controlling for other background factors, and is statistically significant but negligible for self-reported hostility. Hence the model treats the impact as zero.
Social Skills	Carneiro, 2007	Self-reported involvement in crime between ages of 32 and 42 from National Childrens Development Study.	Social skills	-1.8	Percentage points	A one standard deviation increase in social adjustment at 11 is associated with a 1.8 percentage point (7%) reduction in likelihood of being involved in a crime between the ages of 33 and 42.
Conscientiousness / resilience / self-control	Moffit, 2011; Pratt, 2000; Goodman, 2015	Moffit: probability of criminal conviction at age 32.	Conscientiousness / self-control	-1.8	Percentage points	Like sociability, conscientiousness is a strong predictor of crime. For example, Pratt, 2000, found r>0.2 and Moffit found a 7.5 percent reduction in probability of adult conviction of crime for each decrease in quintile of self-control score. The model treats conscientiouness as equal to sociability.
Communications / self-expression	None found	N/A	N/A	0	N/A	
Leadership	None found	N/A	N/A	0	N/A	

Additional / supporting / related evidence not used directly in the model

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Mental health						
Social skills	Carneiro, 2007	Self-reported signs of depression (defined as having a "malaise index" score greater than 7) at age 42	Social skills	-2.5	Percent	
Social skills	Carneiro, 2007	Self-reported signs of psychological distress (defined as having a General Health Questionnaire score greater than 15) at age 42	Social skills	-2.8	Percent	
Physical health						
Conscientiousness / resilience / self-control	Almlund, 2011	Various	Conscientiousness	N/A	N/A	Conscientiousness seems to be the most important Big Five trait in predicting health outcomes, p.166)
Self-reported health						
Social skills	Carneiro, 2007	Poor or fair self-reported health aged 42	Social skills (age 11)	-2.1	Percentage points	
Obesity						
Self-confidence / locus of control	Goodman, 2015	Obesity	Locus of control	-1.8	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Gale, Batty and Deary, 2008	Adult obesity	Locus of control	-8.0	Percent	
Self-confidence / locus of control	Goodman, 2015	Obesity	Self-esteem (low income only)	-1.3	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015	Obesity	Sociability (girls only)	-1.2	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	Obesity	Conscientiousness (low income only)	-0.5	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Smoking						
Self-confidence / locus of control	Goodman, 2015	Daily smoking	Locus of control	0	Percentage points*	Includes controls for child, parent, and family characteristics, and education.

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Self-confidence / locus of control	Goodman, 2015	Daily smoking	Self-esteem	-1.4	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015	Daily smoking	Sociability	0.2	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	Daily smoking	Conscientiousness	-3.1	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Educational attainment						
Self-confidence / locus of control	Baron and Cobb-Clark, 2010, cited in Almlund, 2011 (p.138)	Graduation from high school (Australia)	Internal locus of control	4.5	Percentage points	
Self-confidence / locus of control	Cebi, 2007, and Coleman an dDeLeire, 2003, cited in Almlund, 2011 (p.138)	Graduation from high school	Internal locus of control (not controlled for cognitive skills)	4.5 - 6.8	Percentage points	
Self-confidence / locus of control	Cebi, 2007, and Coleman an dDeLeire, 2003, cited in Almlund, 2011 (p.138)	Graduation from high school	Internal locus of control (controlling for cognitive skills)	1.4 - 1.5	Percentage points	
Social skills	Carneiro, 2007	Literacy or numeracy scores at age 37,	Social skills at age 11	0		
Employment						
In a 'top job'						
Self-confidence / locus of control	Goodman, 2015	In a 'top job'	Locus of control	1.8	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015	In a 'top job'	Self-esteem	0.2	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Almlund, 2011 (p.160)	Probability of being a manager	Locus of control	2.8	Percentage points	
Social skills	Goodman, 2015	In a 'top job'	Sociability	0.6	Percentage points*	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	In a 'top job'	Conscientiousness	2.5	Percentage points	Includes controls for child, parent, and family characteristics, and education.
Income / financial stability						

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Family income (controlling for education)						
Self-confidence / locus of control	Goodman, 2015	Net family income	Internal locus of control	2.1	Percent	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015	Net family income	Sociability	3.4	Percent	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	Net family income	Conscientiousness	3.6	Percent	Includes controls for child, parent, and family characteristics, and education.
Net wealth		Net wealth				
Self-confidence / locus of control	Goodman, 2015	Net wealth	Internal locus of control	0.036	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Self-confidence / locus of control	Goodman, 2015	Net wealth	Self-esteem	0.044	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Social skills	Goodman, 2015	Net wealth	Sociability	0.006	Standard deviations*	Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	Goodman, 2015	Net wealth	Conscientiousness	0.03	Standard deviations	Includes controls for child, parent, and family characteristics, and education.
Hourly pay (if in employment)						
Personality variables	Heckman, Humphries and Urzua (2010) cited in Almlund, 2011, p.155	N/A	N/A	N/A	N/A	Given educational attainment, effects of personality variables on outcomes are weak.
Self-confidence / locus of control	Araujo, 2013	Wages	Self-esteem	Not significant (when direct)	Percent	
Self-confidence / locus of control	Drago, 2011	Wages	Self-esteem	4.3	Percent	
Social skills	Almlund, 2011 (p.160)	Wages	Sociability	6% for managers; 2% for clerical workers; -2% for professionals; 0 for blue collar workers	Percent	
Conscientiousness / resilience / self-control	Heineck, 2010	Wages	Conscientiousness	1.5	Percent	
Conscientiousness / resilience / self-control	Pervoo, 2013	Wages	Conscientiousness	4.1	Percent	
Risk of offending						

YIF Outcome	Source	Measure of impact used in the research (i.e., dependent variable)	Explanatory factor used in the research (i.e., independent variable)	Results from research: 1 SD change in outcome score leads to...	...in unit of change (* = not statistically significant different from 0)	Notes
Self-esteem	Trzesniewski, 2006, Boden, 2007	Criminal convictions	Self-esteem (Rosenburg scale)	Adolescents with low self-esteem were 1.48 times more likely to be convicted of a violent crime and 1.32 times more likely to be convicted of any crime during adulthood.	N/A	Subsequent study of the same data concluded that "The results suggest that self-esteem level plays a limited role in the understanding of violent behavior."
Self-esteem	Boden et al, 2007, cited in Goodman, 2015.	Violent offending	Self-esteem	No coefficient provided	N/A	In a fully adjusted model, the association between self-esteem and violent offending no longer remains statistically significant.
Social Skills	Gendreau, 1996; see also Andrews and Bonta and Goodman, 2015	Criminal behaviour	Sociability, pro-social attitudes	Antisocial attitudes are one of the strongest predictors of criminal behaviour (r = 0.18)	N/A	
Social Skills	Goodman, 2015.	Use of cannabis and arrests	Social skills	No coefficient provided	N/A	Extraversion (personality trait) had significant, [low/medium strength] connections with...cannabis use and ever having been arrested. Includes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	John, Caspi, Robins et al. [1994], quoted in Goodman 2015	Severe delinquent behavior	Concientiousness	No coefficient provided	N/A	In a sample of at-risk youth, boys who had committed severe delinquent behaviors were more than three quarters of a standard deviation lower in Agreeableness and Conscientiousness, as measured by mother's reports at age 12 or 13, than boys who had committed minor or no delinquent behaviors up to that age
Conscientiousness / resilience / self-control	Goodman 2015	Not specified	Conscientiousness	No coefficient provided	N/A	Found a very significant body of work demonstrating the association of self-control, self-regulation (and similar concepts) in childhood with...crime and mortalityIncludes controls for child, parent, and family characteristics, and education.
Conscientiousness / resilience / self-control	De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012, cited in Handbook of Criminology	Not specified	Various	No coefficient provided	N/A	Meta-analysis of 102 studies found significant associations between various measures of self-control and a wide range of outcome behaviors. When self-control was high, it corresponded to functional, adaptive, pro-social behaviors, and when low, it corresponded to dysfunctional, maladaptive, antisocial behaviors.

4.3. Appendix 3: Values of impacts

The table below shows the economic values used in the model. The calculations that support each value are incorporated into the model.

Social and economic impacts	**Economic measure, annual per capita**	**Value (reduction in costs or benefits) in 2018 prices**	**Who receives the benefit?**			
			Participants	HM Exchequer	Community	
Improved mental health	UK expenditure on mental health (2016/17)	-£439.98	0%	100%	0%	NHS / HM Exchequer
	Standard deviation for UK expenditure on mental health (2016/17)	-£2,043	0%	100%	0%	NHS / HM Exchequer
Improved physical health	Estimated cost to NHS of treating people with poor lifestyle	-£396	0%	100%	0%	NHS / HM Exchequer
Educational attainment	Annual increased earnings from getting a degree (males)	£5,924.98	77%	23%	0%	Individual and HM Exchequer
	Annual increased earnings from getting a degree (females)	£7,415.20	77%	23%	0%	Individual and HM Exchequer
Employment / unemployment	Annual welfare payments due to unemployment (JobSeekers Allowance)	-£3,897.92	0%	100%	0%	HM Exchequer
Housing	Annual subsidy to social housing tenants	-£4,803.76	0%	100%	0%	HM Exchequer
Income	Median wages for adjusted for labour rate participation (male)	£24,126.96	77%	23%	0%	Individual and HM Exchequer
	Median wages adjusted for labour rate participation (female)	£14,099.11	77%	23%	0%	Individual and HM Exchequer
Crime	Cost of crime to society per male member of population	-£2,709.09	0%	31%	69%	HM Exchequer, society
	Cost of crime to society per female member of population	-£406.36	0%	31%	69%	HM Exchequer, society

4.4. Appendix 4: Bibliography

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