Always Learning

Educate!'s lessons from an at-scale impact evaluation

Between 2012 and 2016, Educate! greatly expanded its scale from about 50 schools in 2012 to almost 400 in 2016. Despite positive results from our 2012-2013 RCT, we felt we needed an updated estimate of our program's impact at scale. This second evaluation would provide the evidence to give us confidence as we continue to move towards our vision of measurably impacting one million youth across East Africa by 2024.

In 2016, Educate! partnered with BRAC's Independent Research and Evaluation Cell to conduct a quasi-experimental evaluation of the Educate! Experience program to assess the program's impact at scale. The evaluation combined a propensity score matching (PSM) design with a difference-in-differences analysis.

This evaluation (called "PSM" below) found that youth who participated in Educate!'s program performed higher than non-participants in the comparison group in all three of Educate!'s core economic outcomes. The following discussion provides an overview of these findings, and their significance to Educate! as we continue our work in skills-based education.

Key findings

- **Educate! participants earned an average of 95% more than their peers in the comparison group** (significant at the 1% level). For the purposes of this evaluation, we defined "income" as money brought in by students through their own economic activities (businesses or jobs). If students listed their parents as their primary source of income, it was assumed they earned no money from businesses or jobs, and their income was considered $0.

  This income effect is similar to the 105% increase we found through our RCT, albeit starting from a smaller base with a smaller absolute increase. This evaluation's comparison group reported earning about $88 per year whereas the comparison group in the RCT reported annual income of about $165. We find this to be understandable for a couple of reasons. First, as we scaled, we expanded to more rural areas, where income tends to be lower and students start, on average, from a lower base. In rural areas, the local market may also be smaller, there may be generally fewer consumers and fewer formal sector jobs.

  Additionally, we may have found slightly smaller absolute incomes because we updated our income measurement tool to generate more precise estimates of income that were less susceptible to recall bias. Notably, this also meant that it was not possible to compare income between the baseline and follow-up. Therefore, the analysis on income employs a PSM identification strategy, but does not use the Difference-in-Difference analysis approach.

- **Educate!'s program also encouraged more youth to run their own businesses**. Business ownership increased in the treatment group by 44% (significant at the 1% level). This is of a somewhat smaller magnitude than the 64% increase we measured in the RCT, but still meaningful. Moreover, while comparison group students experienced a decline in business ownership between the baseline and follow-up, Educate! participants saw an increase. This suggests that not only did the Educate! program encourage more students to enter business, it also encouraged students who would have stopped operating their business to persevere.

- **Educate!'s program had a statistically significant impact on employment**: the treatment group increased employment by 50%, as compared to their peers in the control group (significant at the 1% level). Interestingly, students in the comparison group were less likely to be employed at follow-up, while the employment rate among Educate! participants stayed constant. This suggests that the Educate! Experience encouraged some students to stick with their jobs. This is new to the PSM, as our RCT did not find a statistically significant impact on employment.

- **Educate!'s program led to a statistically significant improvement in public speaking, leadership, and the number of job-relevant skills** that students reported having (all significant at the 1% level). Coupled with the increase in business ownership and employment, these results suggest such skills may better equip Educate! youth to engage in economic activity. We however didn't see positive impacts across some skills, including self-efficacy, financial literacy, budgeting. We hope to explore through future research how to improve our measurement of these skills and strengthen that content in our program.

- **When we disaggregated the impacts by gender, we saw, similar to the RCT findings, that girls experienced larger relative impacts**: young women's income increased 244% after participating in Educate!'s program (significant at the 5% level), and business ownership and employment rates about double (increasing 91% and 113%, respectively, significant at the 1% level). This demonstrates to us that Educate!'s program continues to help young women succeed and narrow the gender gap.

Diving Deeper

In addition to questions about impact on our key outcomes, the evaluation answered some more detailed questions through closer examination:

- **What drives our impact on income?** Deeper analysis of the data suggests that this increase in income primarily came from Educate!'s program encouraging more students to start businesses or become employed, even while they were still in school. Nearly 50% of youth in the treatment group reported paid employment and/or their business as their main source of income, while only 34% of the comparison group cited employment or business as their primary income source.

- **Improving income measurement**: As mentioned above, in 2016, we significantly improved the tool we used to measure income. This allowed us to calculate income in two ways: first by asking youth about their monthly earnings in total, and second, calculating income by asking youth about their expenses and sales. We found that this second option was much more precise than the first.

  Interestingly, measuring income in these two ways also provided us with useful information about other ways the treatment and comparison group differed at follow-up. Descriptive analysis of the income data showed that the difference between the two different income measurement tactics was smaller in the treatment group than in the comparison group. This suggests that Educate! youth were better at estimating their earnings than their peers in the comparison group.

- **When we specifically examine income conditional on youth reporting income from their own economic activities across both groups** (i.e. comparing just those with income from businesses or jobs across treatment and control to assess the differences in average income of the two groups), we did not find statistically significant differences. At the same time, we did find economically significant differences for just those who have a business. In order to know if Educate!'s program impacts income of youth who would have had businesses or jobs in the absence of the program, we would like to see statistically significant differences in this variable, for just businesses as well as both businesses and jobs. However, there are a few limitations to the analysis that indicate why we might not be able to draw conclusions here:

  First, sample size: Youth were still in school at the time of the follow up. Therefore, many of them still do not have their own sources of income. When we restrict the sample to only those earning their own primary income, we significantly reduced our sample size, and therefore our power to detect impacts.

  Secondly, limiting the sample to only include those youth who reported income from a business or job changes our sample composition. We know that, after participating in Educate!'s program, the treatment group is significantly more likely to have a job or own a business. Therefore, when we look only at youth reporting income at follow-up, our groups are no longer statistically similar. In this specification, our comparison group at follow-up includes only youth who would have had businesses or jobs in the absence of Educate!'s program. Our treatment group, however, represents youth who would have had businesses or jobs anyway *plus* youth who have businesses or jobs as a result of participating in Educate!'s program. There are many reasons to believe that the second group of youth might have systematically different income (for example, their businesses and jobs are newer). This may drag down average income, and could reduce potential difference between the 2 groups.

  This pattern holds when we look solely at business income as well, but is magnified as we see economically significant differences between the treatment and comparison group, but those differences are not statistically significant.

Open Questions

While this evaluation answered a number of important questions, there are still areas we would like to explore further. We hope to explore the following questions in future research:

- **How does the program impact students who would have had a job or business otherwise?** We would like take our analysis to the next level to examine heterogeneous impacts of the program. Specifically, we would like to conduct an analysis of the impact of Educate!'s program on youth who had a business at baseline.

- **What is the long-term impact?** Our theory of change holds that if youth have more practical skills, that match labor market demand, they're economic prospects will improve when they leave secondary school. As youth were still in school at the time of follow-up, it's still early to measure these outcomes. We want to see how these outcomes develop after they leave school and transition into young adulthood. We are currently conducting a long-term follow-up to our RCT to answer this question.

- **What is the impact on Educational Outcomes?** The PSM found that the treatment group was less likely to report repeating a grade. However, because it didn't specify a time period, the wording of the question does not allow us to attribute this difference to the program.

  Similarly, we would also like to know whether youth who participated in Educate!'s program were more likely to pass secondary school exit exams, complete secondary school, or enroll in university. Since youth had yet to take exams or finish secondary school at the time of follow up, those outcomes were not available.

- **Why do some outcomes decrease over time for the control group?** We would like to examine through future research why employment and business ownership decreased for the control group between baseline and follow-up, and why community engagement decreases over time for both groups of students. This would help us address the challenges to economic and community engagement.

Conclusions

Overall, we are pleased with these results. At the same time, we are interested in researching the remaining outstanding questions. We are also committed to continuing our R&D efforts to understand what kind of outcomes we achieve as we experiment with more scalable distribution mechanisms. This can include working through teachers, as we are in Rwanda, or experimenting with measurably reaching more than 40 students per school, which we are trying in Uganda. We see this evaluation as part of an ongoing R&D and learning journey to identify and iterate on solutions that meaningfully impact more and more youth, and are excited to continue on that path.

END OF COURSE EVALUATION REPORT

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EXECUTIVE SUMMARY

The purpose of the end-of-course evaluation is to determine measurable impact of the Educate! Experience program on participants' livelihoods, business ownership, employment, community participation and workforce readiness as students graduate from the program. The following report summarizes the analysis conducted on the baseline and end-of-course data to estimate the impact of the Educate! program so far. The results discussed in this report could prove useful in making necessary amendments to any future questionnaires and programming going forward.

Income and revenues

Students in the treatment group were more likely than their peers in the comparison group to report a personal business, paid job, or both as their main source of income. Most students reported that their main income source was money from parents[1] (56% overall[2]). Females (69%) were more likely to report parents as their primary income source than males (44%). This category is followed by those who reported personal business (24% overall), paid work (12% overall) and both business and paid work (9% overall) respectively. Considering that they are full time students, it makes sense that a majority receive money from either parents or guardians, as they may not have the time to devote to full time work or entrepreneurial activities yet.

Splitting these figures into control and treatment groups, a consistently higher fraction of treatment students report getting their main source of income from a job (2% higher), a business (8% higher) or from both a job and business (6% higher).[3] As would be expected, the number of students that reported money from their parents as their main source of income was 13% lower in the treatment group than in the control group. Qualitative findings confirm student's interest in engaging in business in the future. Lack of start-up capital for a business may have propelled them to take paid jobs or turn to other sources of income in the short-run. Qualitative data also found that generating pocket money, school fees and meeting basic needs were repeatedly cited as the main motivation for starting up a business and/or engagement in income-generating activity.

Program participants earned more than non-program participants on all six income outcomes. Through utilizing Propensity Score Matching along with Difference-In-Difference, the analysis in this report has found from its most sophisticated estimate, that the program positively affected student income outcomes. With income available only at follow-up– propensity score matching was used to create statistically similar groups and later generate average treatment effects. All

[1] Descriptive statistics – simple sample percentages, Including 759 treatment and 759 control Missing values excluded. 64% in Control, 48% in Treatment

[2] Overall refers to the overall student population comprising both students in the treatment and control group.

[3] Results from a Chi-Squared Analysis using earning source and treatment status to find a relationship between the two. ($P<0.01$)

income outcomes were found to be consistently higher for the students in the treatment group than in the control group. Moreover, the magnitude of the difference on average was found to be higher for males than females for all of the income outcomes, while the relative change was larger for females. This is complemented by a statistically significant increased likelihood of having both a job and business for treatment participants. Students during key informant interviews (KII's) were found to have entrepreneurial objectives which, to a great extent, can be attributed to the Educate! program. There were however some challenges which includes limited capital to inadequate technical skills in respective areas of operation which to some extent limited students in turning their entrepreneurial goals into reality.

Mean comparisons (t-tests) were performed to understand trends in subsets of the data. When looking specifically at the business income and job income of exclusively those who reported a business and/or job as their main source of income, differences between the treatment and comparison group remain positive. However, the differences are not statistically significant. Taken together, this suggests that the Educate! Experience increases the number of students engaged in an income generating activity through their own business or through employment, thereby increasing students' average income from economic activity. However, the program has a more limited effect on increasing the incomes of students once they are engaged in these activities. This makes sense as the data reported in this report were collected as students finished the Educate! Experience program, before they completed secondary school.

Business and job engagement

Business and job engagement outcomes were analyzed using a layered Propensity Score Matching (PSM) and Difference in Differences (DID) approach. Impact of the Educate! program on the likelihood of having a business and job from baseline to end-of-course was statistically significant at the highest level. More specifically, those in the treatment group were 11 percentage points more likely to own a business and 8 percentage points more likely to have a job. Disaggregating these results by gender reveal that within treatment, females are more likely to have both jobs and business relative to males.

Descriptive analysis was used to further investigate the type and nature of businesses and jobs students are engaged in. Majority of the students in both treatment and control were found to be engaged in agriculture and livestock rearing. This increases by 3.53% and 0.6% in treatment and control, respectively, from baseline to the end of the program. As evident from the qualitative report, Educate! program was successful in developing entrepreneurial objectives among treated students. The portion of students engaged in small food-making business increased in the treatment group by 8.16% from baseline to the end of the program.

However, there still remained significant challenges that prevented an even larger number of students from engaging in businesses. One that came out repeatedly during focus group discussions was students' difficulty in raising seed money for the business. This might be one of the reasons why we observe a high engagement rate in agriculture among treatment students after the intervention as the amount of investment required to set up an agriculture business is relatively low. During Focus Group Discussions (FGD's) students reported to have attained great ideas from the Educate! Program but limited capital hindered their ability to implement those ideas. Based on this, there is reason to believe that students might experiment with more varied business options if there is a provision for initial start-up capital or more focus is given to how to fundraise during the module stage.

Skills, Educational outcomes, and Community Participation

Program impact was estimated using PSM-DID for skills, community project ownership and education. Educate!'s program was successful in generating a significant positive impact for public speaking, leadership, number of skills, skills score and grit score. For savings, self-efficacy, poverty and budget, the scores were positive but not significant. Overall, females benefited more from the program relative to males in the aforementioned areas. KII's and FGD's shows that Educate! installed entrepreneurial and leadership skills as well as virtues of perseverance, humility, hard work and creativity which contributed to the shaping and achievement of the aforementioned positive differences. Students during FGD's reported to enjoy leadership positions at schools (e.g. head perfect), deliver speeches to large audiences without fear, and act as treasurers in their saving clubs.

Chi-square analysis was used to investigate relationship between educational outcomes and treatment status. At follow-up, treatment students were found less likely to repeat a class relative to control students. This however, cannot be truly attributed to the program because class repetition was inquired for overall schooling years as oppose to last year i.e. just before the Educate! program. Using PSM it was found that for both national and promotional exams, control students perform 0.48 and 0.75 points better than treatment students respectively. Lack of access to-or limited capital was cited as the major challenge to achieving student's education goals. For example, unavailability of qualified teachers, lack of money and support from guardians contribute to students not achieving their education goals.

While community project ownership decreased from baseline to end-of-course among both treatment (42%) and control (74%), the decline was much smaller in the treatment group than in the comparison group. Comparison of the trends of both groups suggests that the Educate! program encouraged some students to continue with community project who would have dropped off in the absence of the program. This is complemented by a PSM-DID positive significant estimate of 0.075 which suggests that treatment students are less likely to discontinue a community project

relative to control students. Reasons for not leaving the community project among treatment students are varied and can range from getting respect in the society to inspiring others to do the same. An overall decrease in community project ownership from baseline to end-of-course might be due to increased interest in business and job ownership which leaves less time for community related work. In fact, being able to start their own business was cited as one of the biggest achievements of the Educate! program during FGD's.

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Sincere appreciation goes to the Educate! staff for the orientation and facilitation as well as the respondents who participated in the evaluation.

Thank you so much.

Independent Evaluation and Research Cell team

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INTRODUCTION

Background

Human capital development is a key pillar in alleviating poverty and achieving sustainable development. Both academics and practitioners concur that a country's potential for sustained and future growth depends, in a large part, on its youth. Hence, investing in the youth is very important in order to realize a youth dividend (Population Council et al. 2013[4], The Guardian 2015)[5]. Although youth make up over 60 percent of Uganda's population, unemployed youth account for over 64 percent of the country's unemployed population (UBOS 2015)[6]. This significant policy challenge requires policymakers to design programs to address this challenge. One way Educate! has attempted to address this issue is by working to transform education to teach youth to solve poverty for themselves and their communities. This forms Educate!'s purpose in Africa and Uganda in particular.

With the mission of developing young leaders and entrepreneurs in Africa, Educate! provides youth with skills training in leadership, entrepreneurship and workforce readiness, along with mentorship, to start real businesses at school. Educate!'s model is delivered through practically-trained teachers and empowered youth mentors. Educate!'s goal is to make this practical, skills-based model part of national education systems.

Educate! believes that secondary education is the most untapped resource for development across Africa and that reforming secondary education at scale is a catalytic, high leverage solution to youth unemployment and consequent issues that arise in a world where 50% of children are African. Hence, Educate!'s solution is a relevant, skills-based model of education that leads to improved livelihoods for youth through formal employment or business ownership, increased business and job creation, improved community participation, and improved 21st century and business/employability skills.

To realize this, Educate! monitors four target outcomes to determine measurable impact of the model. The purpose of this end-of-course evaluation, therefore, is to determine measurable impact of the program on improved livelihoods, increased business ownership and employment, increased community participation and improved workforce readiness.

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[4]Population Council, Ministry of Gender, Labour and Social Development, UNICEF (2013), *"The Adolescent Girls Vulnerability Index: Guiding Strategic Investment in Uganda,"* The Population Council, Inc, New York

[5]The Guardian (2015), *"Sustainable Development Goals: All You Need to Know",* Guardian Global Development, January 2015, retrieved from http://www.theguardian.com/global-development/2015/jan/19/sustainable-development-goals-united-nations on 6th August 2015

[6] Uganda Bureau of Statistics, 2015 Statistical Abstract Report

Methodology

The evaluation used a mixed-methods approach: quantitative and qualitative methods to assess the breadth and depth of the impact respectively. Quantitatively, Educate! and BRAC employed a multi-layered quasi-experimental approach. This involves using Propensity Score Matching along with Difference-In-Difference (PSM-DID) methodology to estimate the impact of the program. When combined, the two approaches reduce bias in the estimation. Missing values in the dataset were dealt using Multiple Imputation Chained Equation (MICE). Qualitatively, Focus Group Discussions (FGD's) and Key Informant Interviews (KII's) were used to understand aspects of the intervention which otherwise would have been missed using quantitative tools only. Chi Square statistics were used to investigate the relationship between categorical variables. Analyses for outcome variables with no baseline data employ a propensity score matching technique to compare end-of-course values of treatment and control groups, as opposed to estimating differences from baseline to follow-up between treatment and control participants. The usage of propensity score matching to generate average treatment effects is more rigorous than simple mean comparison using t-statistics primarily because the former adjusts for pre-treatment observable differences between treatment and control groups. Lastly, outliers were detected and treated using z-scores.

Propensity Score Matching

Matching uses statistical techniques to construct a comparison group. For every possible unit in the treatment group, it attempts to find a non-treatment unit (or set of non-treatment units) that is similar on as many observable characteristics as possible. Finding a good match for each program participant requires approximating as closely as possible the characteristics that explain that individual's decision or opportunity to enroll in the program. As one increase the number of characteristics or dimensions against which you want to match units that enrolled in the program, you may run into what is called the *curse of dimensionality*[7].

Fortunately, the curse of dimensionality can be quite easily solved using a method called *propensity score matching* (Rosenbaum and Rubin 1983). In this approach, we no longer need to try to match each enrolled unit to a non-enrolled unit that has exactly the same value for all observed control characteristics. Instead, for each unit in the treatment group and in the pool of non-enrolled, we compute the *probability* that this unit will enroll in the program (the so-called propensity score*)* based on the observed values of its characteristics (the explanatory variables).

[7] As the number of characteristics or dimensions against which we match units that are enrolled in the program, we may run into what is called the curse of dimensionality. This is because we can only match on a few factors/variables/characteristics. The method of propensity score matching allows this matching problem to be reduced to a single dimension i.e. a score. Thus, rather than matching on all values of the variables, individual units can be compared on the basis of their propensity scores alone.

This score is a real number between 0 and 1 that summarizes the influence of all of the observed characteristics on the likelihood of enrolling in the program.

Once the propensity score has been computed for all units, then units in the treatment group can be matched with units in the pool of non-enrolled that have the closest propensity score. These closest units become the comparison group and are used to produce an estimate of the counterfactual. The propensity score–matching method tries to mimic random assignment to treatment and comparison groups by choosing for the comparison group those units that have similar propensities to the units in the treatment group. Since propensity score matching is not a randomized assignment method but tries to imitate one, it belongs to the category of quasi-experimental methods. The average difference in outcomes between the treatment or enrolled units and their matched comparison units produces the estimated impact of the program. In summary, the program's impact is estimated by comparing the average outcomes of a treatment or enrolled group and the average outcomes among a statistically matched subgroup of units, the match being based on observed characteristics available in the data at hand.

Overall, it is important to remember that matching methods can use only observed characteristics to construct a comparison group, since unobserved characteristics cannot be measured and therefore cannot be included in the calculation of the propensity score. If there are any unobserved characteristics that affect whether a unit enrolls in the program and also affect the outcome, then the impact estimates obtained with the matched comparison group would be biased. For a matching result to be unbiased, it requires the strong assumption that there are no unobserved differences in the treatment and comparison groups that are also associated with the outcomes of interest.

The Difference-In-Differences Method

The difference-in-difference-method compares the changes in outcomes over time between a population that is enrolled in a program (the treatment group) and a population that is not (the comparison group). In this method, the impact of the program is defined as the change in outcomes of the treatment group before and after the program, less the change in outcomes in the comparison group before and after the program.

First, by measuring the difference in the before-and-after outcomes for the enrolled groups—the first difference—we see how the treatment group changed between when they began and when they completed the program. This also allows us to controls for factors that are constant over time in that group (such as race, ethnicity etc.), since we are comparing the same group to itself. But we are still left with the factors that vary over time (time-varying factors), independent of the program. One way to capture those time-varying factors is to measure the before-and-after change in outcomes for a group that did not enroll in the program but was exposed to the same set of

environmental conditions— the second difference. If we "clean" the first difference of other time-varying factors that affect the outcome of interest by subtracting the second difference, then we have eliminated a source of bias that worried us in the simple before-and-after comparisons. The difference-in-differences approach does precisely that. It combines two estimates of the counterfactual (before-and-after comparisons, and comparisons between those enrolled and those who are not enrolled) to produce a better estimate of the counterfactual.

To understand how difference-in-differences is helpful, let us think of a simple pre-post analysis, which compared units that were enrolled in a program with those that were not enrolled in the program. The primary concern with this comparison is that the two sets of units may have had different characteristics and that it may be those characteristics—rather than the program—
that explain the difference in outcomes between the two groups. The unobserved differences in characteristics were particularly worrying: by definition, it is impossible for us to include unobserved characteristics in the analysis. The difference-in-differences method helps resolve this problem to the extent that many characteristics of units or individuals can reasonably be assumed to be constant over time (or time-invariant) for example a person's personality traits or family health history etc. Most of these types of variables, although plausibly related to outcomes, will probably not change over the course of an evaluation.

Instead of only comparing outcomes between the treatment and comparison groups after the intervention, the difference-in-differences method compares the change each group undergoes between the beginning and end of the program. By subtracting the before outcome situation from the after situation, we cancel out the effect of any characteristics that are unique to that individual that do not change over time. Interestingly, we are canceling out (or controlling for) not only the effect of observed time-invariant characteristics, but also the effect of unobserved time-invariant characteristics. This technique also allows groups to be compared that might be slightly different at the beginning of the program or at baseline, as long as we can assume the groups would experience the same change over time in absence of the program.

Combing Propensity Scores with Difference-In-Difference

When baseline data on outcomes are available, propensity score matching can be combined with difference-in-differences to reduce the risk of bias in the estimation. As discussed, simple propensity score matching cannot account for unobserved characteristics that might explain why a group chooses to enroll in a program and that might also affect outcomes. Matching combined with difference-in-differences accounts for any unobserved characteristics that are constant across time between the two groups. It is implemented as follows:

1. Perform matching based on propensity scores calculated using observed baseline characteristics[8].
2. For each enrolled unit, compute the change in outcomes between the before and after periods (first difference).
3. For each enrolled unit's matched comparison, compute the change in outcomes between the before and after periods (second difference).
4. Subtract the second difference from the first difference; that is, apply the difference-in-differences method.
5. Finally, average out those double differences.

Multiple Imputation Chained Equations (MICE):

There are many different approaches to addressing missing data and the first question researchers might ask is "why use multiple imputation?" In certain circumstances (e.g., when there is less than 5% missingness and the missingness is totally random and does not depend on observed or unobserved values), complete case analysis may be an acceptable approach to addressing missing data (Graham, 2009; Schafer, 1999). In practice, these circumstances rarely occur. While complete case analysis may be easy to implement it relies upon stronger missing data assumptions than multiple imputation and it can result in biased estimates and a reduction in power (Graham, 2009). Single imputation procedures, such as mean imputation, are an improvement but do not account for the uncertainty in the imputations; once the imputation is completed, analyses proceed as if the imputed values were the known, true values rather than imputed. This will lead to overly precise results and the potential for incorrect conclusions. Maximum likelihood methods are sometimes a viable approach for dealing with missing data (Graha, 2009); however, these methods are primarily available only for certain types of models, such as longitudinal or structural equation models.

Multiple imputation has a number of advantages over other missing data approaches. Multiple imputation involves filling in the missing values multiple times, creating multiple "complete" datasets[9], the missing values are imputed based on the observed values for a given individual and the relations observed in the data for other participants, assuming the observed variables are included in the imputation model.

Multiple imputation procedures, particularly MICE, are very flexible and can be used in a broad range of settings. Because multiple imputation involves creating multiple predictions for each missing value, the analyses of multiply imputed data take into account the uncertainty in the imputations and yield accurate standard errors. Especially if the observed data are highly predictive

[8] The following variables were used for matching – age, gender, self-efficacy score, grit score, poverty score and skills score.

[9] Described in detail by Schafer and Graham (2002)

of the missing values[10] the imputations will be more consistent across imputations, resulting in smaller, but still accurate, standard errors (Greenland and Finkle, 1995). Multivariate imputation by chained equations (MICE), sometimes called "fully conditional specification" or "sequential regression multiple imputation" has emerged in the statistical literature as one principled method of addressing missing data.

Many of the initially developed multiple imputation procedures assumed a large joint model for all of the variables, such as a joint normal distribution. In large datasets, with hundreds of variables of varying types, this is rarely appropriate. Multivariate imputation by chained equations (MICE) is an alternative, flexible approach to these joint models. In fact, MICE approaches have been used in datasets with thousands of observations and hundreds (e.g., 400) of variables (He et al., 2009; Stuart et al., 2009).

In the MICE procedure is a series of regression models are run whereby each variable with missing data is modeled conditional upon the other variables in the data. This means that each variable can be modeled according to its distribution, with, for example, binary variables modeled using logistic regression and continuous variables modeled using linear regression.

MICE STEPS:

1. A simple imputation, such as imputing the mean, is performed for every missing value in the dataset.
2. The mean imputations for one variable (let say "var") are set back to missing.
3. The observed values from the variable "var" in Step 2 are regressed on the other variables in the imputation model, which may or may not consist of all of the variables in the dataset. In other words, "var" is the dependent variable in a regression model and all the other variables are independent variables in the regression model.
4. The missing values for "var" are then replaced with predictions (imputations) from the regression model.
5. Steps 2–4 are then repeated for each variable that has missing data. The cycling through each of the variables constitutes one iteration or "cycle." At the end of one cycle all of the missing values have been replaced with predictions from regressions that reflect the relationships observed in the data.
6. Steps 2 through 4 are repeated for a number of cycles, with the imputations being updated at each cycle. The number of cycles to be performed can be specified by the researcher. At the end of these cycles the final imputations are retained, resulting in one imputed dataset. Generally, ten cycles are performed (Raghunathan et al., 2002).

[10] This is exactly the situation we have. The missing values in scores is a direct result of what we have in the question variables of those scores. This is basically a case of Missing at Random (MAR), which means that the probability that a value is missing depends on observed values.

Although the MICE approach is a principled method of addressing missing data, it is important to acknowledge certain complexities and limitations of the approach. While MICE offers great advantage over other missing data techniques in terms of its flexibility, a primary disadvantage is that MICE does not have the same theoretical justification as other imputation approaches. In particular, fitting a series of conditional distributions, as is done using the series of regression models, may not be consistent with a proper joint distribution. Initial research suggests that this may not be a large issue in applied settings (Brand, 1999; Schafer & Graham, 2002).

Chi-square test:

A chi-square statistic is used to investigate whether distribution of categorical variables in a 2*2 contingency table differ from one another. More simply, it is used to investigate if there is a relationship between two categorical variables. The test assumes the expected value of each cell to be greater or equal to five. In the present report, chi-square is used to analyze the relationship between categorical variables having only end-of-course data, for example, examining the relationship between treatment status and class repetition. The p-value in the chi-square statistics is used to determine the significance of the relationship between the two variables in question whereas Cramer's V is used a post-test to determine strengths of association after chi-square has determined significance.

Treatment of Outliers:

An outlier is an observation that appears to deviate markedly from other observations in the sample. Outliers distort the picture of the data we obtain using descriptive statistics and data visualization. The present study uses z-score to identify and treat outliers. The Z-score, or standard score, is a way of describing a data point in terms of its relationship to the mean and standard deviation of a group of points. Taking a Z-score is simply mapping the data onto a distribution whose mean is defined as 0 and whose standard deviation is defined as 1. The goal of taking Z-scores is to remove the effects of the location and scale of the data, allowing different datasets to be compared directly. The intuition behind the Z-score method of outlier detection is that, anything that is too far from zero. For the purposes of this analysis, we will use the threshold of a Z-score of 3 or -3, which is a commonly used threshold. This means that any value laying outside of 3 standard deviations from the mean (in either direction) will be considered an outlier. The appendix includes statistical tables without outliers discussed in the chapters of this report.

Sample Size and Demographics:

The survey focused on measuring key program outcomes that included project ownership (business / community project), student income, job ownership, key soft and practical skills and

poverty levels. The survey was implemented successfully in 52 schools (26 in the treatment group and 26 in the comparison group) and was completed by 2,220 students in baseline which was reduced to 1,715 students after matching. Out of 1,715, a total of 1,617 students or 94% students were matched in both baseline and end-of-course using PSM to be used later in analysis for respective sections. The sample is roughly equally split between treatment and control at 49.35% and 50.65%, respectively as well as between males and females at 50.96% and 49.04%, respectively.

These absolute ratios differ slightly between males and females in the treatment (57% M vs 43% F) and control group (45% M vs 55% F).

Gender	Control	Treatment	Total
Male	0.45	0.57	0.51
Female	0.55	0.43	0.49
Total	100	100	100

There is also little difference between students in treatment and control for current class. The proportion typically stays same as one moves to higher levels of secondary classes (see table below).

Class	Control	Treatment	Total
1	0.06	0.94	0.49
2	0.06	1.38	0.71
3	17.77	20.36	19.05
4	17.22	20.3	18.74
5	33.82	29.95	31.91
6	31.07	27.07	29.1
Total	100	100	100

All these ensure the two groups to be statistically similar and that the only difference between the two is that one got the treatment and the other didn't. This is important to establish as it correctly attributes any positive statistical differences between treatment and control to the intervention / program alone.

To complement the quantitative data collection, BRAC also collected qualitative data to begin to explain the why and how behind what changes were observed by the survey data. Qualitatively, eight (8) Focus Group Discussions and twenty-six (26) Key Informant Interviews were conducted on student beneficiaries by research assistants. They Focus Group Discussions and Key Informant Interviews were held in the following schools:

- *Central Region:* Forest Hill College (Mukono); St. Andrew Kaggwa Secondary School, Kasaala (Luwero); St. Charles Lwanga Secondary School (Lugazi); and St. John's Secondary School, Kabuwoko (Masaka).
- *Eastern Region:* Kisozi Progressive Secondary School (Kamuli); Busembatia Secondary School (Bugiri-Iganga); Tororo Universal College (Tororo); and Victoria High School (Bugiri-Iganga).

After the consent of the participants, the interviews and discussions were recorded and transcribed. The transcribed data was analysed basing on the interview/discussion themes. The interview themes regarded the respondents' present and future goals, the achievements, obstacles to achieving these goals and Educate!'s relevance in helping the beneficiaries to achieve these goals. Finally, the study also wanted to get feedback from the respondents about the program especially on how it can be improved.

The remained of the report details the findings of the analysis and proceeds as follows: Chapter One discusses income and revenue, chapter two reviews the impacts on job and business ventures, and chapter three discusses impacts on skills, community project and education.

CHAPTER ONE: INCOME AND REVENUES

The chapter covers the outcomes relating to income among program and non-program participants which are analyzed by disaggregating the data by treatment status as well as by gender. The results presented reflects average treatment effects generated using propensity score matching and end-of-course income data[11]. A high percentage of students (52%) listed their income source as parents. This coupled with 6.12% missing values reduced the overall sample size by about 59%. To restore statistical power all such values were replaced by zero. This also allowed us to examine income from students' economic activities, rather than general income. The analysis begins by briefly describing the most commonly mentioned sources of income for the cohort of students and of the total number of students that responded to this question.

1.1. Source of income

Figure 1: Main Source of Income (in percent and frequencies in brackets)

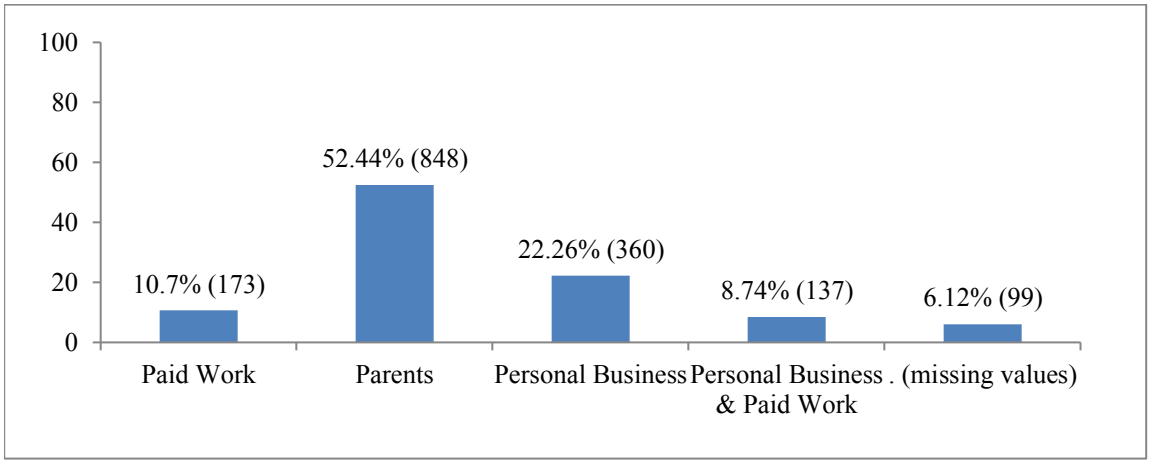
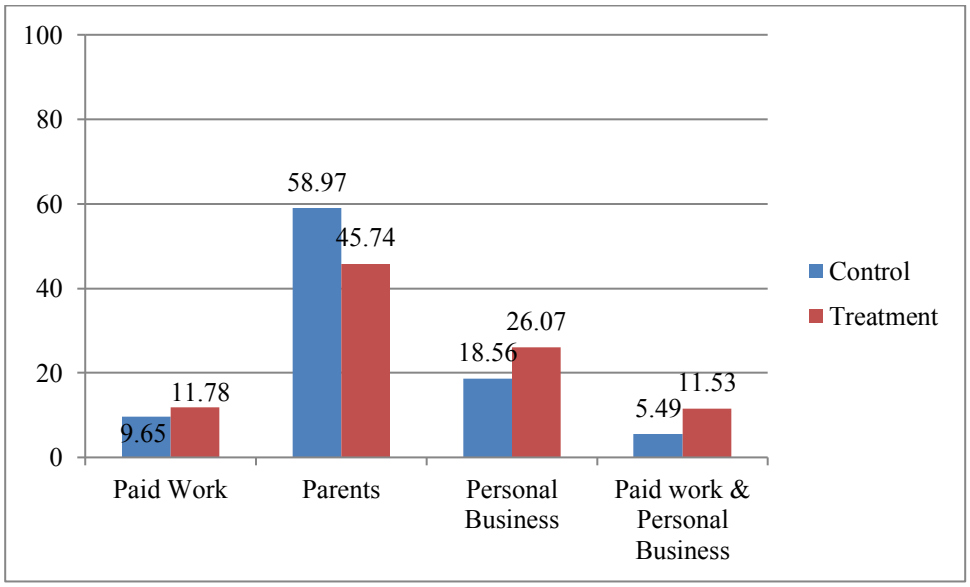


Figure 1 reveals a majority of students reporting that their main income source was money from parents (52.44%). These were followed by those who reported personal business income as their main source of income (22.26%). Students who reported paid work as their main source of income came third with 10.70%. About 8.74% received their income from both business and paid job. Considering that they are full time students, it would make sense that an overwhelming majority receive money from either parents or guardians, as they may not have the time to devote to full time work or entrepreneurial activities yet.

[11] The income section was introduced in the follow-up thus making a baseline to end-of-course analysis not possible for income indicators. This limits our ability to do a baseline to end-of-course comparison for the graphs discussed in this chapter.

Splitting these figures into control and treatment groups, Figure 2 below shows that consistently a higher fraction of treatment students report getting their main source of income from a job (2% higher), a business (8% higher) or from both a job and business (6% higher). As would be expected, the number of students that reported money from their parents as their main source of income was 13% lower in the treatment group than in the control group. Qualitative findings on multiple occasions confirm student's interest in engaging in business in the future. Lack of start-up capital for a business may have propelled them to take paid jobs or turn to other sources of income in the short-run. This however, shouldn't be mistaken for a capitalist mindset being instilled in students as a result of the Educate! program rather generating pocket money, school fees and meeting basic needs as a motivation for starting up a business later were the most cited reasons for engagement in income-generating activity.

Figure 2: Main Source of Income for Students in Treatment vs. Control at End of Program



On average, when disaggregated by gender[12] (Table 1), 62% of females versus 32% of males in the treatment category reported that money from their parents was their main source of income. The percentage of males who reported money from their parents as their main source of income was 21% lower in the treatment group than in the control group. This percentage was lower by 17% for females. The Educate! experience is expected to have long term positive effects in the form of more students being engaged in personal business. Some of the students in the treatment group reported to have engaged in paid job only to start their own business from the proceeds later while those engaged in business already, have intentions to expand.

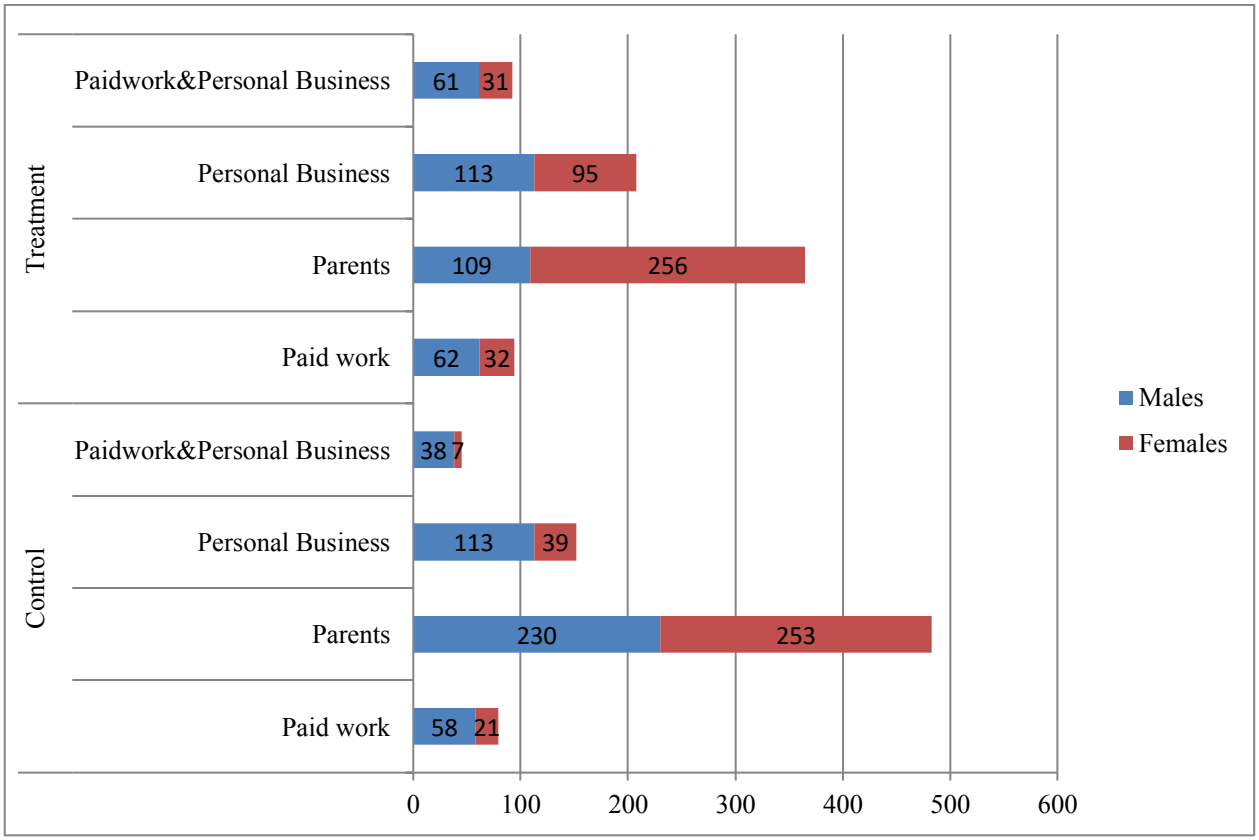
[12] Excluding 99 missing values from 1617 observations.

Table 1: Main Source of Income for Students in Treatment and Control disaggregated by gender (%)

	Treatment			Control		
Income Source	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Job	17.97	7.73	12.38	13.21	6.56	10.41
Parents	31.59	61.84	48.09	52.39	79.06	63.64
Business	32.75	22.95	27.40	25.74	12.19	20.03
Business + Job	17.68	7.49	12.12	8.66	2.19	5.93
Total	100%	100%	100%	100%	100%	100%

The results above are also disaggregated by gender using absolute values as illustrated by figure 3 below.

Figure 3: Main Source of Income for Students in Treatment and Control disaggregated by gender (absolute figures)



1.2. Average Monthly Total income – Option 1 and Option 2

This section disaggregates the data by the treatment category to compare the outcomes among the treatment and control students. The survey collected two different measures of business income, referred to as option 1 and option 2[13]. The following abbreviations of income indicators shall be used hereafter.

I. Average Monthly Total Income – Option 1 (AMTI-Option 1) is monthly business income option 1 plus monthly job income option 1.
II. Average Monthly Total Income – Option 2 (AMTI-Option2) is monthly business income option 2 plus monthly job income option 2.
III. Monthly Business Income Option 1 (see footnote 20)
IV. Monthly Business Income Option 2
V. Monthly Job Income Option 1 – Monthly self-reported income for those who earn a fixed income and average of high income and low income for those whose income are different in different seasons in a given year.
VI. Monthly Job Income Option 2 – Self-reported job annual income divided by 12.

As discussed previously, a high proportion of students (53%) report their parents / guardians as their main source of income. This coupled with 6% missing values decreases the amount of data available for analysis for this section to 41% or 670 students. To counter this limitation, we analyzed the data in multiple ways as follows:

1) Means comparison of Income, conditional on reporting any income from a source other than parents: Analyzing all income indicators using t-test mean comparisons while deleting missing values and students who get their income from parents. (Analysis Sample - 670 students)
2) Means comparison of Income from student economic activities: Analyzing all income indicators using t-test mean comparisons while replacing missing values and students who get their income from parents to zero. (Analysis Sample – 1617 students)
3) Estimation of impact of program on Income from student economic activities: Analyzing all income indicators using PSM average treatment effects while replacing missing values and students who get their income from parents to zero. (Analysis Sample – 1609 matched from baseline to end-of-course)

In this section, we discuss results from analysis 3, which employs the use of propensity score matching (PSM) to generate average treatment effects. We selected this specification for 2 reasons: First, we wanted to make sure we compared groups that were statistically similar. If we analyze a sample that only includes those who reported income from their own economic activities, we

[13]The first option for computing average monthly business income relies on a comprehensive analysis aggregating both the computed earnings on each product or service – of the three most prominent – that the student sells and the estimated annual income that the student reports for that product/services. The second option for computing average monthly business income takes average monthly business income based on what the student reports as their annual income from *all* of the businesses that they run. The two different figures reported for average total monthly income reflect the inclusion of each of the different average monthly business estimates.

include students who would have had a job or business, regardless of the program, in both the treatment and comparison group, but the treatment group also includes students who were motivated or empowered by the Educate! program to start businesses or take up jobs. This means our two groups are no longer equal. Secondly, and much less importantly, we selected this specification because it allows us to maintain a sufficient sample size to be confident in the conclusions. This prevents us from excluding 59% of our sample.

1.2.3. Comparing Income from Students' Economic Activities

Substituting the missing values with zero considers the assumption that students who did not respond to the income source question or reported parents as their source of income earn zero income from their own economic activity[14]. The results presented in Table 4 uses a Propensity Score Matching (PSM) technique to estimate the impact of the Educate! Experience program[15].

Table 2: Analysis with 1609 students the substitution of missing values showing the Average Treatment Effect (ATT)

Variable	Treated	Controls	Difference	S.E.	T-stat
AMTI - Option 1	48,232	24,687	23,545	9,975	2.36***
AMTI - Option 2	38,644	33,992	4,651	111,86	0.42
Monthly Business Income - Option 1	31,338	13,510	17,829	9,343	1.91*
Monthly Business Income - Option 2	28,227	17,992	10,235	10,429	0.98
Job Income - Option 1	16,862	11,181	5,681	3,091	1.84*
Job Income - Option 2	10,386	9,090	1,296	2,269	0.57

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level.

Table 4 shows that, using PSM approach, income is consistently higher for the students in the treatment group than in the control group. However, only option one gives statistically significant differences at the highest level. For option one, the average monthly total income is significantly higher by 23,545 UGX ($p<0.01$), the average monthly business income is significantly higher by

[14] Neither the baseline nor the follow-up survey recorded income levels for those who receive money from parents – something that can be embedded in future surveys.

[15] These are different from that of Table 3 (in appendix) with respect to the methodology used to estimate the differences. T-test mean comparisons (Table 3 in appendix) are a standard and very well recognized way of computing and comparing mean differences between two groups. PSM, while requires a bigger sample than other analysis techniques, produces more precise and rigorous impact estimates. Also, since the participants were not randomly assigned to groups before intervention, we depend on the PSM technique to produce two groups that are not statistically similar across all observables and unobservables. It's because of this why PSM is being given preference to over t-test mean comparisons since PSM adjusts for pre-intervention differences between the two groups. For more information on the PSM design and technique, see the Methodology section.

17,829 UGX ($p<0.10$), and the average monthly job income is significantly higher by 5,681 UGX ($p<0.10$). Using option two, the average monthly total income was higher by 4,651 UGX, the average monthly business income was higher by 10,235 UGX and the average monthly income was higher by 1,296 UGX. As already indicated earlier on, these differences are not statistically significant.

A number of things are worth mentioning if results in Table 2 and 3 from the appendix are compared with that of Table 4. Firstly, the fact that all differences turn to positive signals the importance of sample size and composition for these types of analysis. The magnitude of mean differences along with standard errors decreases significantly in Table 2 and Table 3. This is partly due to the increased sample size which normalizes the coefficient values and makes them reflect a true picture as opposed to being affected by a small sample size, and also because of the substitution by zero which greatly reduced the average in both treatment and control groups. Moreover, the analysis no longer focuses only on students earning income through employment, business or both rather all students irrespective of their income sources are included. Income values for students' earning income from parents and missing values were substituted by zero. So a change of definition from general income to income from students' economic activity also has a role to play in normalizing the estimates.

1.. Heterogeneous impacts on income, disaggregated by gender

This section attempts to estimate the different impact of the Educate! program on income between male and female students.

Heterogeneous Treatment Effects of Gender on Income Outcomes Average Treatment Effect Females - PSM Table					
Variable	**Treated (431)**	**Control (354)**	**Difference**	**S.E**	**T-stat**
AMTI - Option 1	31,100.03	9,053.28	22,046.75	10,723.10	2.06**
AMTI - Option 2	23,204.09	14,039.14	9,164.95	6,945.87	1.32
Monthly Business Income - Option 1	23,724.74	4,232.86	19,491.88	10,445.40	1.87*
Monthly Business Income - Option 2	15,828.80	9,218.72	6,610.08	6,499.04	1.02
Job Income - Option 1	7,317.29	4,820.42	2,496.87	2,235.14	1.12
Job Income - Option 2	3,449.71	4,032.60	-582.89	1,299.94	-0.45
Average Treatment Effect Males - PSM Table					
Variable	**Treated (358)**	**Control (464)**	**Difference**	**S.E.**	**T-stat**
AMTI - Option 1	69,126.55	40,913.32	28,213.24	12,318.40	2.29***
AMTI - Option 2	71,757.84	44,762.43	26,995.41	10,490.76	2.57***
Monthly Business Income - Option 1	40,679.63	22,592.46	18,087.17	10,287.42	1.76*
Monthly Business Income - Option 2	43,310.92	26,376.40	16,934.52	8,445.65	2.01**
Job Income - Option 1	28,446.93	18,330.17	10,116.76	5,849.11	1.73*
Job Income - Option 2	18,794.23	13,882.87	4,911.36	4,309.14	1.14

The table above shows the difference between males and females in treatment and control groups among income outcomes. The differences for all income outcomes for both males and females between treatment and control is positive. The magnitude of the difference on average is higher for males than females, however female treatment students experience larger gains relative to their comparison group counterparts for total income and business income (but not for job income). For females, five of the six differences are positive, and two of the five positive differences are statistically significant. The positive gender income differences are in line with income tables in appendices which also discusses positive income differences between program and non-program participants. Participation in the Educate! program has clearly benefited both males and females. This is complemented by a statistically significant increased likelihood of having both a job and business for treatment participants (discussed in later sections).

Conclusion

Regarding income source at follow-up (for both treatment and control), a large majority of students reported that their main income source was money from parents with females more likely to receive money from parents than males. This category is followed by those who reported personal business, paid work and both business and paid work respectively. When a comparison is made between the treatment and control groups, it is observed that there are more students in the treatment group who reported getting their main income from a paid job, personal business or both, and fewer who reported parents as their main source of revenue.

The Educate! Experience program significantly improved students' income: when analyzing students' monthly income from their economic activity (jobs and businesses) using the Propensity Score Matching (PSM) approach for both options 1 and 2 gives higher income results for the students in the treatment group than in the control group. The same was found to be true when the analysis was disaggregated by gender

When analyzing income among only those youth who reported personal businesses, jobs, or both as their main source of income, the story is mixed.

- For those who get most of their income from paid work, the income outcomes are statistically and significantly lower for students in the treatment group than for those in the control group, when looking at both options.
- For students with personal businesses[16], income outcomes for students in the treatment group are better than those for the students in the control group though not statistically significant.
- Considering students who report that the majority of their income comes from both paid jobs and personal businesses, both options 1 and 2 indicate that students who are in the

[16] Table 6 in appendix

treatment group reported lower average monthly total income than those in the control group.

When all income sources (paid job, personal business, as well as paid job and personal business) are disaggregated by gender for both treatment and control groups combined, it is observed that male students earn more than the female students for both options. The same trend is observed in the treatment group and control group respectively. While the impact of the Educate! Experience on income for young men is larger in an absolute sense, the relative impact of the program on female students is larger.

CHAPTER TWO: JOB AND BUSINESS OWNERSHIP

This chapter breaks down the job and business ventures that the students are most engaged in and reports results by the treatment status as well as by gender. It also analyzes the difference in business and job engagement between baseline and end-of-course as presented in tables below. For variables having both baseline and follow-up data, program impacts are estimated using PSM-DID as indicated on the top of the tables.

Table 6: Average Treatment Effect (Sample 1614 Students)

Panel A - Average Treatment Effect (PSM-DID)					
Variable	Treated	Controls	Difference	S.E.	T-stat
Having a Business	0.0594	-0.0573	0.1167	0.0300	3.89***
Having a Job	-0.0024	-0.0877	0.0853	0.0288	2.96***
Panel B - Heterogeneous Effects of Educate! by Gender (PSM-DID)					
	Female	SE	Male	SE	Difference
Having a Business	0.135***	0.036	0.098	0.040	0.037
Having a Job	0.104***	0.035	0.073*	0.039	0.031

Table 12 uses PSM-DID to estimate the impact of Educate! program on those who were treated and later decomposes the result by gender as well. Students who got the Educate! program are more likely to own a business as well as a job. More specifically, those in the treatment group are 0.11 percentage points more likely to have a business and 0.08 percentage points more likely to have a job. The results are significant at the highest level. The negative coefficients in the control column present an interesting situation. As the comparison group is intended to represent what would have happened without the program, we can interpret negative coefficients here as evidence that employment and business ownership would have fallen among students in the last year of secondary school. Over time, some in the control group decided not to keep with their jobs or their business. In the treatment group, we see the portion of students with a business increase, and those with a job decreases by a smaller margin than in the comparison group. This leads us the estimate the impact of the educate program as positive and statistically significant for both outcomes. Meaning that the Educate! program caused more students to start a business and fewer students to leave their job.

Further decomposing the positive impact of the program on job and business and disaggregating the results by gender reveals that, after the program, females in the treatment group are 0.135 percentage points more likely to have businesses and 0.10 percentage points more likely to have jobs than females in the control group. This difference is significant at the highest statistical significance. As a result of the Educate! program, males in the treatment group are also more likely to have both jobs and business, but the difference is only statistically significant for having a job. The difference between males and females are positive meaning that for both job and business females are more likely to benefit relative to males. In other words, it appears as the overall

program effect on owning a business and having a job is driven by results among young women. The difference between the 2 genders, however, is not significant.

2.1. Business engagements among students

Figure 4: Business engagement among students by gender for control and treatment groups (absolute figures) – Descriptive Analysis

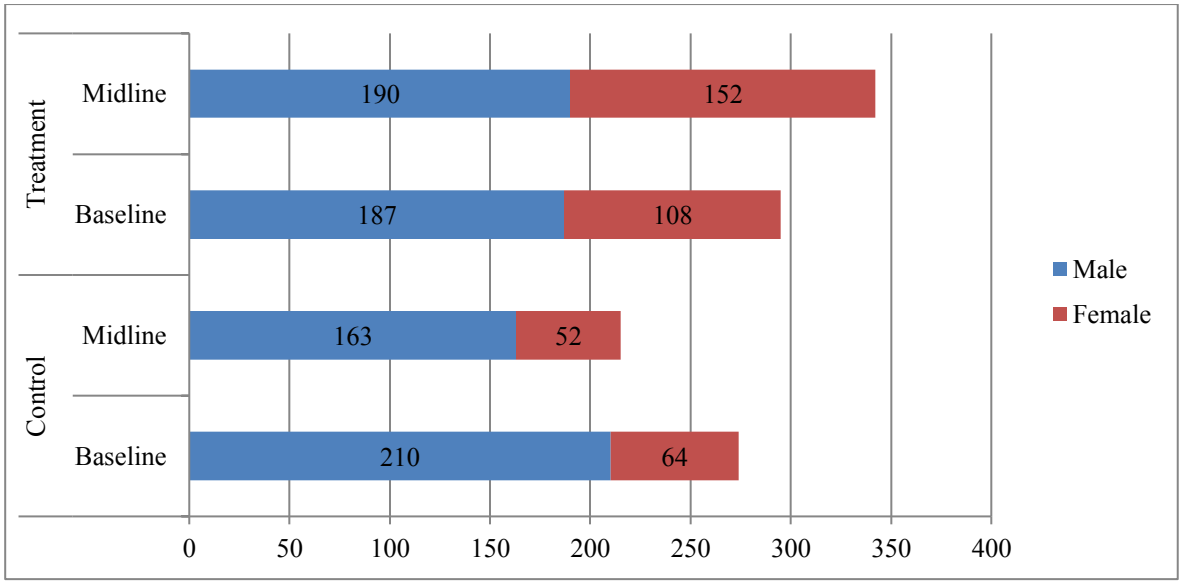


Figure 4 indicates that there are more students who are engaged in business in the treatment group than in the control group. However, the respective groups have more male students than female students. More so, there was a drop in the number of students engaged in business at follow-up in the control group compared to the baseline. These results are also broken down in percentages in Table 13.

Table 3: Business engagement among students by gender at baseline and follow-up (amounts in percentages, descriptive analysis)[17]

Treatment				
Business Engagement	Male		Female	
	Baseline	End of Course	Baseline	End of Course
No	47.08	46.80	75.17	64.69
Yes	52.92	53.20	24.83	35.31
Control				
Business Engagement	Male		Female	
	Baseline	End of Course	Baseline	End of Course
No	55.48	64.73	82.20	85.31
Yes	44.52	35.27	17.80	14.69

Table 13 indicates an increase of 0.28 pp[18] for males and 10.48 pp for females who engaged in business from baseline to end-of-course in the treatment group. This increase is fueled by more girls engaging in business after the treatment relative to treatment boys. Overall, the Educate! program does motivate students to set up their own business. This is also evident by the decrease in the percentage points of males and females from baseline to end-of-course in the control group. One probable reason for that might be without the program, control students didn't have the right amount of skill set or motivation to either engage or sustain their existing businesses.

Table 4: Business engagements type among students (amounts in percentages)

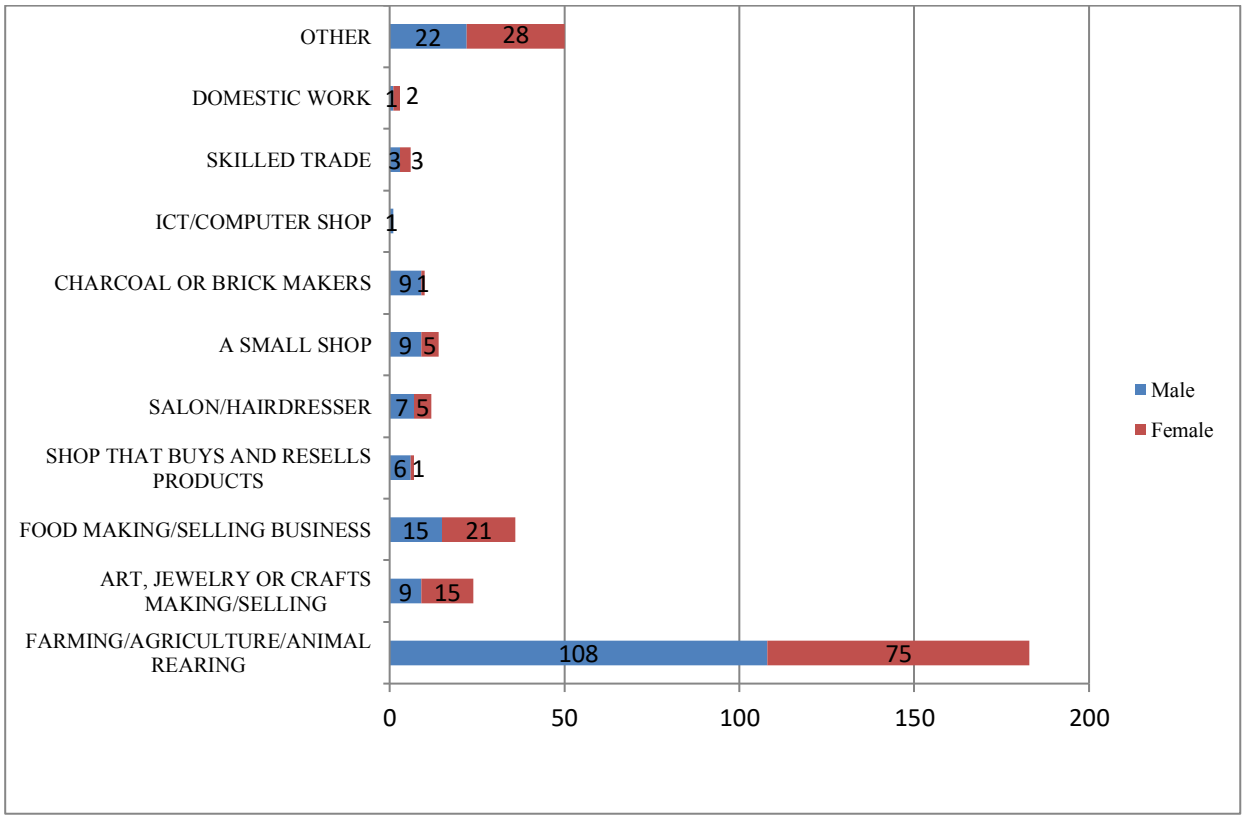
Business Type	Control		Treatment	
	Baseline	End of Course	Baseline	End of Course
FARMING/AGRICULTURE/ANIMAL REARING	50.36	51.16	48.81	52.34
ART, JEWELRY OR CRAFTS MAKING/SELLING	3.28	6.98	7.12	7.02
FOOD MAKING/SELLING BUSINESS	1.09	6.05	2.37	10.53
SHOP THAT BUYS AND RESELLS PRODUCTS	5.84	5.58	7.46	2.05
SALON/HAIRDRESSER	7.30	1.86	4.41	3.51
A SMALL SHOP	2.92	7.91	1.69	4.09
CHARCOAL OR BRICK MAKERS	5.11	3.72	9.49	2.92
ICT/COMPUTER SHOP	8.39	1.86	4.75	0.29
SKILLED TRADE	5.47	1.86	4.75	1.75
DOMESTIC WORK	1.82	0.47	2.37	0.88
OTHER	8.39	12.56	6.78	14.62
Total	**100**	**100**	**100**	**100**

[17] 565 students in baseline (T295+270C) and 561 (T345+216C) in follow-up said Yes to having a business.
[18] Percentage points (pp)

From the table above, it is observed that a majority of the students reported having businesses in agriculture or livestock rearing. For both treatment and control, the number of students engaged in farming and agriculture from baseline to end-of-course by 3.53% and 0.6% percentage points respectively. Overall, a majority of students in either treatment or control in either baseline or end-of-course were engaged in farming and agriculture. In both treatment and control, students are more likely to engage in food making or selling business. This might be due to the low investment required to set up business. For control, the number of students engaged in food making and selling business increased by 4.96 percentage points, whereas for treatment, it increased by 8.16 percentage points. Agriculture was followed by the food making and art-jewelry-craft making businesses respectively.

The qualitative findings reveal the diversity in student goals related to job and business engagement. Students expressed their willingness to join high-paid jobs including that of becoming an engineer, lawyer, doctor etc. Those with entrepreneurial goals are in clothes, livestock, agriculture etc. FGD findings confirm that students found it difficult to raise money for their business ideas which propelled them to other sources of income.

Figure 5: Business type engagement at follow-up by gender in the treatment group



The figure above shows that majority of the students were engaged in farming and agriculture with male students being more involved than females. Female students were mostly involved in

businesses related to art, jewelry or craft making, food making/selling, domestic work and other business categories. Skilled trade businesses were split between males and females.

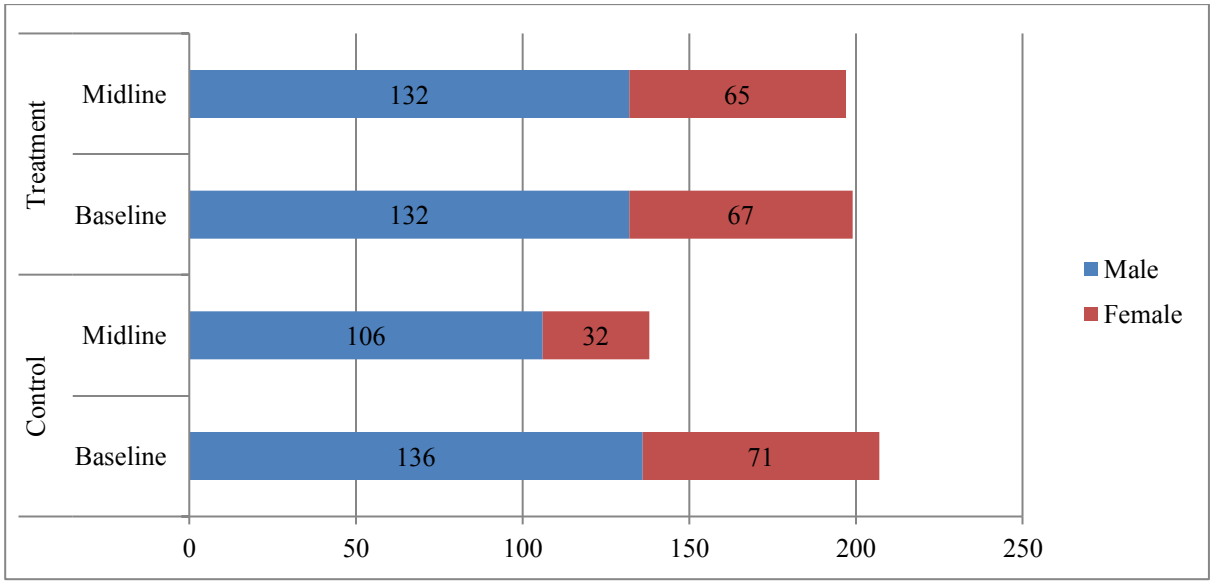
2.2. Job engagement among students

Table 5: Job engagement[19] among students by gender at end of course – descriptive analysis

Treatment				
Job Engagement	Male		Female	
	Baseline	End of Course	Baseline	End of Course
No	62.12	62.12	84.51	84.74
Yes	37.88	37.88	15.49	15.26
Control				
Job Engagement	Male		Female	
	Baseline	End of Course	Baseline	End of Course
No	70.54	76.77	80.23	90.96
Yes	29.46	23.33	19.77	9.04

Table 15 indicates that the number of students in the treatment group who engaged in job from baseline to end-of-course remains pretty much the same. From earlier sections, we know that most of students went on further to establish their own business. The number of females in the treatment group who were engaged in job from baseline to end-of-course did not change at all. For control group however, a lower number of males and females managed to keep their job from baseline to end-of-course.

Figure 6: Job engagement among students by gender



Like for business, male students generally dominated the job sector. Still there was a drastic drop among students in the control group from baseline to end-of-course. These results are broken down by job category.

Table 6: Job engagement types among students [20] (amounts in percentage, descriptive analysis)

Type of Job	Baseline		End of Course	
	C	T	C	T
FARMING/AGRICULTURE/ANIMAL REARING	29.95	26.13	13.77	15.74
ART, JEWELRY OR CRAFTS MAKING/SELLING	7.73	9.05	5.80	6.60
FOOD MAKING/SELLING BUSINESS	1.93	7.54	8.70	13.71
SHOP THAT BUYS AND RESELLS PRODUCTS	3.86	6.53	14.49	10.15
SALON/HAIRDRESSER	9.66	9.05	9.42	4.57
A SMALL SHOP	3.86	5.53	7.97	12.69
CHARCOAL OR BRICK MAKERS	7.25	6.53	0.72	3.55
ICT/COMPUTER SHOP	7.25	4.52	7.97	2.54
SKILLED TRADE	13.04	8.54	12.32	10.66
DOMESTIC WORK	6.76	8.04	2.17	3.55
OTHER	8.70	8.54	16.67	16.24
Total	100	100	100	100

From the above table, we observe a big 10.79 pp decrease in the number of treatment students who were working in farming or agriculture. This is followed by an even greater 16.18 pp decrease in the number of control students working in the same sector. Probably, some of these students started working in food making / selling business. This is evident by a 6.77 pp increase from baseline to follow-up for control, and a 6.71 pp increase from baseline to end-of-course for treatment students. There is a drastic drop in the number of students that are engaged in domestic work at follow-up compared with baseline for both control and treatment groups. It is worth noting that in the treatment group the number of students who are involved in other categories of jobs increased drastically by 7.7 pp from baseline to follow-up.

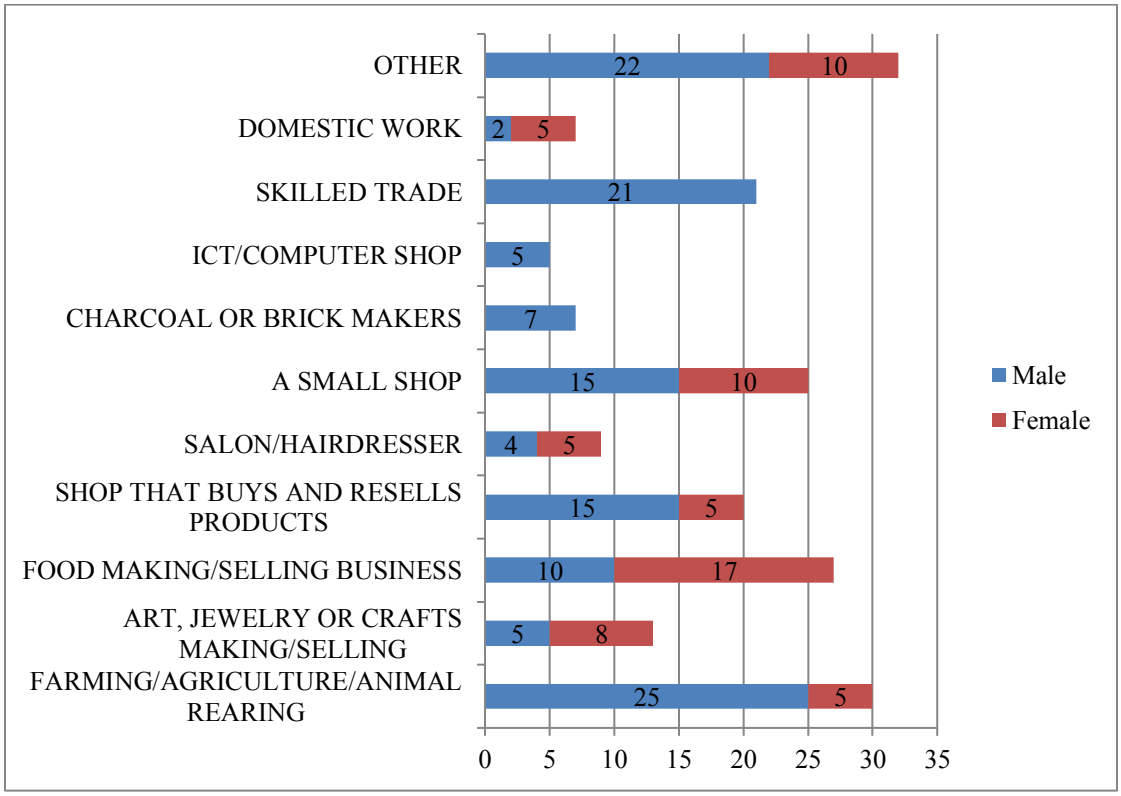
At baseline, agriculture-related jobs were the most common type of job held by females engaged in some sort of job in both treatment (14.93%) and control (16.90%). That was different at follow-up, as females in both groups shifted away from agriculture to other professions. The decrease in agriculture related jobs among females from baseline to end-of-course for both control and treatment was moderate at 7.52% and 7.24% for control and treatment respectively. For females in the treatment group this might be due to the Educate! experience whereas those in

[20]A total of 405 students (T199+206C) in baseline and 343 (T203+140C) in follow-up said yes to being engaged in job.

the control might have done so because of a unit increase in education from baseline to end-of-course.

Figure 7: Job type engagement by gender at end of course in the treatment group

Job Type	End of Course			
	Male		Female	
	T	C	T	C
FARMING/AGRICULTURE/ANIMAL REARING	15.09	19.7	9.38	7.69
ART, JEWELRY OR CRAFTS MAKING/SELLING	5.66	3.79	6.25	12.31
FOOD MAKING/SELLING BUSINESS	8.49	7.58	9.38	26.15
SHOP THAT BUYS AND RESELLS PRODUCTS	13.21	11.36	18.75	7.69
SALON/HAIRDRESSER	7.55	3.03	15.63	7.69
A SMALL SHOP	4.72	11.36	18.75	15.38
CHARCOAL OR BRICK MAKERS	0.94	5.3	-	-
ICT/COMPUTER SHOP	10.38	3.79	-	-
SKILLED TRADE	14.15	15.91	6.25	0
DOMESTIC WORK	1.89	1.52	3.13	7.69
OTHER	17.92	16.67	12.5	15.38
Total	100	100	100	100



According to the figure above, male students were dominant in jobs related to farming, trade shops, small shops charcoal or brick making, ICT/computer shops, skilled trade and other job categories[21]. On the other hand, female students were dominant in jobs related with art, jewelry or craft making, food making, salon/hair dressing and domestic work. This distribution is rather logical due to the fact that in the Ugandan context, there are jobs which are perceived to be for females and those which are perceived to be for males.

This section discussed the impact of Educate! experience on job and business ownership between treatment and control as well as males and females. Students in the Educate! program are more likely to have both job and a business. Similar trends were observed for both males and females in treatment and control from baseline to end-of-course. There were larger impacts among young women than young men for both outcomes. This difference however was not significant and might be due to chance. These positive differences are also translated into positive income differences for both males and females.

Descriptive analysis provides further detail about any emerging differences. A slight shift in the nature of jobs and type of businesses were observed with treatment students. This includes businesses involving food making and standalone shops among others. Farming/agriculture dominates both business and job natures. This might be because in the regions where students live, agriculture and farming are a common economic activity. It would be interesting to investigate how these proportions change in the long run.

[21] There was missing data for jobs which have 100% dominance.

CHAPTER THREE: SCORES, COMMUNITY PROJECT AND EDUCATION

This chapter analyzes the outcomes relating to scores[22] measuring various dimensions of youth skills and practice among program and non-program participation. Heterogeneous effects of the program participation were also traced and impact on gender was observed. This is presented in the table below. The results presented reflect the results of a PSM-DID analysis outlined in the beginning of the report, which relies on a comparison of participants and non-participants from baseline to end-of-course before and after the intervention.

3.1. Average treatment effect of Educate! program on key soft and practical skills

Table 7: Average Treatment Effect (PSM-DID)

Average Treatment Effect (Sample 1614 Students)					
Variable	**Treated**	**Controls**	**Difference**	**S.E.**	**T-stat**
Public Speaking Score	0.3891	-1.0088	1.3979	0.3650	3.83***
Leadership Score	0.6780	-0.9942	1.6722	0.3949	4.23***
No of Skills	0.2528	-0.4589	0.7117	0.1702	4.18***
Savings Score	-0.0266	-0.0960	0.0694	0.0692	1
Self-Efficacy Score	0.9652	0.5904	0.3748	0.8966	0.42
Grit Score	-0.0976	-0.5644	0.4668	0.2417	1.93*
Poverty Score	7.2544	6.9650	0.2894	0.4482	0.65
Skills Score	0.0317	0.0002	0.0315	0.0173	1.81*
Budget Score	0.0942	0.0730	0.0213	0.0287	0.74
Financial Literacy Score	0.0512	0.1149	-0.0637	0.0340	-1.88
Creativity Score	0.1333	0.4692	-0.3358	0.1244	-2.7
Community Project	-0.0879	-0.1634	0.0755	0.0253	2.99***

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

In the table above, all items have a positive baseline to end-of-course difference except literacy and creativity scores. However, six (highlighted) of the eleven items listed above have a significant positive program impact. The negative values in the control column should also be viewed as program success as it answers the question "what would have happened to the treatment students in absence of the program". At baseline, it was well established that the two groups were similar. The negative control values signify that control group students' skills reduced between baseline and end-of-course, and suggest that the treatment group would have experienced the same effect

[22] Public Speaking Score, Leadership Score, No of Skills, Savings Score, Self-Efficacy Score, Grit Score, Poverty Score, Budget Score, Literacy Score, Skills Score and Creativity Score

over time. The positive differences experienced by the treatment group between baseline and follow-up suggest that the Educate! Experience program not only helped students in the treatment group improve their skills, but may have prevented a decline in their skills as seen in the control group. Even for items where both control and treatment values are negative, the difference is still positive, suggesting the Educate! Experience program saw student. The standard error for all items also appears to be very small indicating the estimate appears to be very close to the true population estimate.

From the table above, we see that the public speaking score is higher for students in the treatment group. The average public speaking score is about 1.39 points higher ($p<0.01$) for students who received the program. Interestingly enough, females seem to have benefited more from the program relative to their male counterparts. More specifically, females in the treatment group have a public speaking score which is 1.231 points ($p<0.01$) higher than the average public speaking score for males in the treatment group. These findings are also consistent for other items in table 17 namely – leadership score, self-efficacy score and grit score, as show in Table 18.

Table 11: Heterogeneous Effects of Educate! by Gender

Table 11: Heterogeneous Effects of Educate! by Gender (PSM-DID)					
	Female	**SE**	**Male**	**SE**	**Difference**
Public Speaking Score	1.918***	0.44	0.687	0.486	1.231
Leadership Score	2.265***	0.476	0.8330	0.527	1.432
No of Skills	0.51**	0.209	0.801***	0.232	-0.291
Savings Score	0.047	0.085	0.047	0.094	0
Self-Efficacy Score	0.67	1.097	-0.044	1.214	0.714
Grit Score	0.492*	0.296	0.154	0.328	0.338
Poverty Score	0.231	0.546	0.149	0.604	0.082
Skills Score	0.033	0.021	0	0.024	0.033
Budget Score	-0.032	0.035	0.062	0.039	-0.094
Financial Literacy Score	-0.065	0.043	-0.046	0.047	-0.019
Creativity Score	-0.435***	0.153	-0.243	0.169	0.1995
Community Project	0.071**	0.031	0.086**	0.034	-0.015

Program and non-program participants were also assessed based on the skill-set they have. For each skill, a self-assessed skill instrument was administered to gauge student's comfort with a particular skill. A total of 13 skills were assessed. Number of skills as well as a skill score was later calculated from the instrument. Those who received the program reported to have on average 0.71 more skills ($p<0.01$) than those who did not receive the program. This is complemented by a significant positive skill score difference. More specifically, those in the treatment group have 0.03 ($p<0.05$) points higher skill score than those in the control group. Program impact on number of

skills was significant for both males and females while males on average were found to have 0.29 more skills than females. Not only are the coefficients for both males and females positive, but females tend to have gained more from the program relative to males. This is evident by a positive significant coefficient for most of the items in Table 11 for females. Those coefficients measure the difference between females in the treatment and control adjusted for the transition from baseline to end-of-course. More specifically, females in the treatment group perform 1.91, 2.26, and 0.51 points more in public speaking, leadership and skills score relative to females in the control group. Males also seem to perform better in most of the areas as is evident by positive coefficients. The coefficients for males however aren't statistically significant. The difference between males and female's outcomes are positive meaning female benefited more from the Educate! experience.

3.2. Leadership

Educate! develops young leaders in Uganda through encouraging scholars to take social responsibility in their community and possess key leadership skills. As show in Table 17, ownership of community project and presence of leadership skills were assessed from baseline to end-of-course. Those in the treatment group have 1.67 points ($p<0.01$) higher leadership score than those in the control group. As displayed in Table 18, the difference is positive for both males and females while treatment females score significantly higher (1.432 higher, $p<0.01$) than treatment males. These findings are in line with the ownership of community projects as program participants are likely to have 0.075 ($p<0.01$) more community projects than non-program participants. The impact is statistically significant for both males and females in the treatment group while males this time are more likely (0.015 higher, $p<0.05$) to have community projects than females. From the above it is clear having a community projects are strongly correlated to having leadership skills. Program motivates equally both males and females in owning a community project but females for some reason get more out of it (gauged by a high leadership score among treatment females) relative to males in the treatment group.

3.3. Education

A high percentage of students in both treatment and control attended school in the year before the program, passed the last national examination (99.69%) as well as the last promotional examination (98.97%). These high positive responses hinder our ability to do any meaningful analysis between treatment and control since a big proportion in both treatment and control are already inclined towards education. However, we were able to find some interesting insights in other areas of education.

Table 8: Students' Performance – Chi-Square Analysis

Repeat Class	Control	Treatment	T-C
No	48.76	51.24	2.48
Yes	55.92	44.08	-11.48
Total	50.66	49.34	-1.32
P-value = 0.012 Cramér's V[23] = 0.0633			

Those in the treatment group are less likely to have repeated a class compared to those in the control group. It is worth noting that the wording of the question did not instruct students to only answer yes if they've repeated a class since the baseline, so these differences should probably not be interpreted as implying program effects. The 11.84% difference* is significant (Pearson p-value) but the association between the two variables (repeat class and treatment status) is very weak (as demonstrated by the Cramer's V value that is more close to zero. X). It is important to note that a significant difference in chi-square test does not refer to individual item difference, instead it is the overall model (or 2*2 cross table) which is significant.

Table 9: Relationship between Division of the National Exam and Treatment Status – Chi-Square Analysis

Division Analysis National Exam			
Division	Control	Treatment	T-C
1	52.94	47.06	-5.88
2	49.82	50.18	0.36
3	53.35	46.65	-6.7
4	52.78	47.22	-5.56
Total	51.39	48.61	-2.78
P-value = 0.627 Cramér's V = 0.0336			

Division performance does not vary much between treatment and control. Moreover, neither the difference is significant nor the association between the two variables strong.

Table 21: Comparing National and Promotional Exam scores between treatment and control (PSM-End-of-Course Data)

[23] Measures how strongly the two variables are associated with one another. Cramer's V varies between 0 and 1. Close to 0 it shows little association between variables. Close to 1, it indicates a strong association.

Average Treatment Effect Males - PSM Table - End-of-Course Data					
Variable	**Treated**	**Control**	**Difference**	**S.E.**	**T-stat**
National Exam Score (T-751 / C-793)	19.83	20.32	-0.48	0.84	-0.58
Promotional Exam Score (T-331 / C-290)	39.33	40.09	-0.75	1.09	-0.7

National and promotional exam scores refer to scores for student's enrolled in secondary school classes. The distribution of students enrolled in classes remains pretty much the same between treatment and control. Majority of the students are in S6 (62% in control, 54% in treatment), followed by S4 (32% in control, 38% in treatment) and lastly S5 (about 1% in both treatment and control). This distribution was important to note to make sure the results are equally representing a weighted average of all classes. For both national and promotional exam, students in the control group score about 0.50 points more in the exam than those in the treatment group. The magnitude of the difference is very small and is not statistically significant.

3.4. Community Project Ownership

The table below lists percentages for males and females in both treatment and control for students who answered the community project ownership question.

Table 10: Community Project Ownership

Table-C – (in percentages)						
Community[24] Ownership	**Treatment**					
	Male		**Female**		**All Students**	
	Baseline	**End of Course**	**Baseline**	**End of Course**	**Baseline**	**End of Course**
Yes	26.74	14.21	16.17	10.48	22.00	13.21
No	73.26	85.79	83.83	89.52	78.00	86.79
Community Ownership	**Control**					
	Male		**Female**		**All Students**	
	Baseline	**End of Course**	**Baseline**	**End of Course**	**Baseline**	**End of Course**
Yes	27.53	6.88	16.38	3.95	19.00	2.66
No	72.47	93.12	83.62	96.05	81.00	79.34

Table 11: Average Treatment Effect of Educate! on Community Ownership (PSM-DID)

Table 15 - Average Treatment Effect (Sample 1614 Students)					
Variable	Treated	Controls	Difference	S.E.	T-stat
Community Project	-0.0879	-0.1634	0.0755	0.0253	2.99***
Heterogeneous Effects of Educate! by Gender – PSM-DID					
	Female	SE	Male	SE	Difference
Community Project	0.071**	0.031	0.086**	0.034	-0.015

Only 21% (350/1617) of students in the whole sample reported having a community project during

[24] A total of 350/1617 students in baseline (T183+167C) and 143/1617 students in follow-up (T46+97C) said yes to having a community project.

baseline. This figure decreased to 9% (143/1617) at follow-up. This decrease may be because students discontinued a previously owned community project in both control and treatment groups. More specifically, community ownership in control group decreased by 74% whereas in the treatment group it decreased by 42% from baseline to end-of-course.

The same trend is observed when we disaggregate the data by gender. Treatment males were found to have decreased community project ownership by 12.53 pp whereas control males decreased community ownership by much higher (20.22 pp). The same is true for treatment females whose community ownership decreased by 5.69 pp which was much lower than the decrease rate for control females i.e. 12.15 pp. These trends are later translated into a higher likelihood for treatment students to own a community project. Specifically, treatment students are 0.0755 points more likely to own a community project than control students. The coefficient is significant at the highest level suggesting that the estimated coefficient and corresponding standard errors is not due to chance.

Treatment male students apparently have benefited more from the program in this area and are more likely to engage in community projects relative to treatment female students. Treatment males are 0.015 points more likely to own a community project than treatment females. The estimate however is small and not significant.

Conclusion

Regarding scores, all program outcomes have a positive baseline to end-of-course difference except financial literacy and creativity. However, only six items - listed above have a significant positive program impact. Females who participated in the Educate! program seem to have developed more skills than their male counterparts, especially in public speaking, community engagement, GRIT, and leadership. The same applies for self-efficacy score, grit score, skills and literacy score. Program impact on the breadth of skills was significant for both males and females while males on average were found to have more skills than females.

Concerning education, it was not all the possible to estimate a meaningful treatment effect since most of the students both in control and treatment had taken and passed the last national and promotional examination the before joining the program. Nonetheless, there was suggestive evidence that students in the treatment group are less likely to repeat a class compared to those in the control group. Division status does not vary much between treatment and control. Although students in the control group tend to significantly perform better in national and promotional examinations than those in the treatment group, the results are not all that reliable because small samples were used for the analysis. We should note that the survey was administered a few months before many of the students sat for their final S6 national exams (to graduate from secondary school) so the next follow up should attempt to gather information on their performance on that exam.

CHAPTER FOUR: CONCLUSION AND RECOMMENDATION

The end-of-course study aimed at assessing the impact of the Educate! Program on the youth as far as gaining skills and raising income are concerned. A quasi-experimental approach comprising PSM-DID was used for the analysis. A qualitative study was conducted to, where possible, try and explain some of the quantitative results. Basing on this methodology the following conclusions and lessons learnt have been presented.

Through utilizing Propensity Score Matching along with Difference-In-Difference, the analysis in this report has found from its most sophisticated estimate, that the program positively affected student income outcomes. Program participants earn more than non-program participants on all six income outcomes. When gender is analyzed, the results are similar with treatment males earning more than treatment females in all income areas.

Students in the Educate! program are also more likely to be engaged in both job and business relative to control students. Students during KII's were found to have entrepreneurial objectives which, to a great extent, can be attributed to the Educate! program. There were however some challenges which includes limited capital to inadequate technical skills in respective areas of operation which to some extent limited students in turning their entrepreneurial goals into reality.

Treatment students also performed positively to various dimensions of youth skills (public speaking, leadership, savings, self-efficacy, grit, poverty, skills, budget and community ownership). Students during FGD's and KII's reported Educate! to have installed entrepreneurial and leadership skills as well as virtues of perseverance, humility, hard work, creativity and attitude into the students which invaluably contributed to shaping and achievement of their goals. Moreover, the positive impact of Educate! went beyond the student level affecting families and members of the community as well.

A number of immediately relevant insights can be taken by Educate! from this report's analysis. One main message is that their program's approach to increasing business and community project ownerships is proving to be very effecting, something which might have affected the aforementioned positive income levels. However, there does not seem to be evidence of the desired effect of producing students with improved creativity and financial literacy skills, something which may lead Educate! to reconsider some of its belief on how best to develop entrepreneurial ability.

Overall, the program was successful in generating positive impacts for most of the areas it targeted at the onset. The evaluation team believe the following recommendations to have the potential to further refine the service delivery and magnify the positive impact of the Educate program.

Firstly, inclusion of parents and members of the community in both quantitative and qualitative survey holds the potential to estimate spillover effects of the program that goes beyond the student level. This is important as most student reported to have inspired and motivated people in their community to be involved in the same line of work.

Secondly, program participants vary in terms of their needs and ability to respond to various areas of the program. Addressing needs at a personal level might be outside the scope of Educate! program but collaboration and involvement of external stakeholders might be one way to deal with this. Moreover, students were found to have some misconceptions regarding the scope of the program which ultimately gave rise to false expectations[25]. This to a great extent can be taken care of during the introductory phase of the program.

A negative literacy and creativity score might be explained by students not being fully trained in these areas. The can be due to treatment students missing those modules or mentors skipping classes – something that was reported by program participants during the qualitative survey. Inclusion of attendance sheets for both mentors and students can enable the evaluation team to better investigate the negative scores in the aforementioned areas by relating individual module scores with their exposure to the program[26]. Additionally, a supervision mechanism for mentors can also be introduced to ensure a uniform method of delivery.

Lastly, introducing incentives to curb student dropout, more weightage being given to certain modules (for instance fundraising) during the training stage, and introducing success stories from previous programs can boost the overall motivation for the participants of the Educate! program. Insights into the types of community projects and their potential impact can be investigated through additional data collection and consequently aid the evaluation team in identifying specific areas of the program design and delivery that could be changed to improve outcomes. In terms of future quantitative analysis of this program, a follow-up on program participants will reveal the long-term effects of the program, and stronger causal insight can be gained on income outcomes by increasing the sample size for students engaged in business and paid jobs respectively.

[25] It was revealed during the qualitative survey that some respondents thought the program also includes financial assistance in the form of grants, scholarship or loans.
[26] Proxy for attendance in those modules.

APPENDICES

Comparing Male & Females (Only Job, Both Treatment & Control)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	120	81809.722	53	56589.623	25220.100**
Average monthly total income - option 2	120	82004.167	53	56589.623	25414.544**
Average Monthly Income 1	110	89277.273	49	60698.98	28578.293**
Average Monthly Income 2	114	66896.199	48	35052.778	31843.421**

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Only Business, Both Treatment & Control)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	226	72761.386	134	72329.881	431.505
Average monthly total income - option 2	226	80627.434	134	65673.975	14953.459
Average monthly business income - option 1	226	72761.386	134	72329.881	431.505
Average monthly business income - option 2	226	80627.434	134	65673.975	14953.459

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Both Job & Business, Both Treatment & Control)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	99	216553.871	38	101898.9	114654.967
Average monthly total income - option 2	99	253960.605	38	91132.016	162828.589
Average monthly business income - option 1	99	123447.81	38	50444.956	73002.854
Average monthly business income - option 2	99	160854.544	38	39678.07	121176.474
Average Monthly Income 1	84	109732.143	34	57507.353	52224.790*
Average Monthly Income 2	85	69503.921	33	33622.475	35881.447**

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Only Job, Only Treatment)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	62	73548.39	32	43375	30173.387**
Average monthly total income - option 2	62	73548.39	32	43375	30173.387**
Average Monthly Income 1	58	78620.69	29	47000	31620.690**
Average Monthly Income 2	60	59022.22	29	19279.89	39742.337*

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Only Business, Only Treatment)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	113	70493.86	95	93658.46	-23164.601
Average monthly total income - option 2	113	92093.29	95	59871.54	32221.753
Average monthly business income - option 1	113	70493.86	95	93658.46	-23164.601
Average monthly business income - option 2	113	92093.29	95	59871.54	32221.753

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Both Job & Business, Only Treatment)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	61	200352.5	31	101321.8	99030.684
Average monthly total income - option 2	61	175783.1	31	95118.28	80664.784*
Average monthly business income - option 1	61	108155.7	31	42845.97	65309.77
Average monthly business income - option 2	61	83586.34	31	36642.47	46943.867
Average Monthly Income 1	52	108153.8	28	64741.07	43412.775
Average Monthly Income 2	52	61288.46	27	34674.38	26614.078*

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Only Job, Only Control)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	58	90640.81	21	76726.19	13914.614
Average monthly total income - option 2	58	91043.1	21	76726.19	14316.913
Average Monthly Income 1	52	101163.5	20	80562.5	20600.962
Average Monthly Income 2	54	75645.06	19	59127.19	16517.869

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Only Business, Only Control)

Variables	Male	Mean1	Female	Mean2	MeanDiff
Average monthly total income - option 1	113	75028.91	39	20375.64	54653.268**
Average monthly total income - option 2	113	69161.58	39	79808.12	-10646.542
Average monthly business income - option 1	113	75028.91	39	20375.64	54653.268**
Average monthly business income - option 2	113	69161.58	39	79808.12	-10646.542

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Comparing Male & Females (Both Job & Business, Only Control)					
Variables	**Male**	**Mean1**	**Female**	**Mean2**	**MeanDiff**
Average monthly total income - option 1	38	242561.4	7	104454.8	138106.639
Average monthly total income - option 2	38	379456.1	7	73478.57	305977.564
Average monthly business income - option 1	38	147995.6	7	84097.62	63897.992
Average monthly business income - option 2	38	284890.3	7	53121.43	231768.917
Average Monthly Income 1	32	112296.9	6	23750	88546.875*
Average Monthly Income 2	33	82449.5	6	28888.89	53560.606

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

(to add the final version of the qualitative report)

1.2.1. Comparing Incomes between Treatment and Control – Deleting Missing Values and Income Source from Parents and using Mean Comparison.

Table 12: **T-test Comparisons of income outcomes between treatment and control excluding non-responses**

670 Respondents (amounts in Uganda Shillings)							
Variables	**T**	**Mean-T**	**C**	**Mean-C**	**MeanDiff**	**SE**	**p-value**
AMTI - Option 1	394	96,888	276	94,528	2,359	21,802	0.91
AMTI - Option 2	394	77,608	276	117,323	-39,714	23,214	0.04**
Monthly Business Income - Option 1	300	82,630	197	78,606	4,024	27,872	0.88
Monthly Business Income - Option 2	300	74,430	197	112,312	-37,882	29,471	0.09*
Monthly Job Income - Option 1	167	79,999	110	96,434	-16,436	14,122	0.12
Monthly Job	168	48,950	112	72,343	-23392.**	10283	0.01***

Income - Option 2							

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level, SE = Standard Errors

It is observed that when using option 1, treatment students have a marginally higher average monthly total income than control students. The opposite is true for the average monthly business income. However, students in the treatment group have a lower monthly job income – option 1 than those in the control group.

We observed a tread of students relying less on parent's income in the treatment group. Those in the treatment group are 15.55% less likely to report having parents as an income source. We are also cognizant of the fact that our T and C groups, when we look only at those who reported income not from their parents, are no longer the same size. This could mean that, while the groups were statistically equal at the beginning, they are most likely not statistically equal now, as participation in the Educate! program seems to have driven some of the students in treatment schools into jobs or business activity. It's also reasonable to believe that some students might need a longer time frame to make the same switch.

1.2.2. Comparing Incomes between Treatment and Control – Replacing Missing Values and Income Source from Parents with Zero and using Mean Comparison.

Table 13: T-test comparison with 1617 students and substitution of missing values with zero

1617 Respondents							
Variables	**T**	**Mean-T**	**C**	**Mean-C**	**MeanDiff**	**SE**	**p-value**
AMTI - Option 1	798	47,837	819	31,865	15971.990*	9,183	0.08*
AMTI - Option 2	798	38,317	819	39,537	-1,219	9,757	0.45
Monthly Business Income - Option 1	798	31,064	819	18,917	12,147	8,569	0.15
Monthly Business Income - Option 2	798	27,981	819	27,015	966	9,099	0.91

Job Income - Option 1	798	16,742	819	12,952	3,789	2,867	0.18
Job Income - Option 2	798	10,305	819	9,893	412	2,070	0.84

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level, SE = Standard Errors

It is interesting how almost all income differences turn positive and size of standard errors decrease significantly when we replace the 59% (947 students) deleted data values (in earlier section) with zero. This ensures the point made earlier about low sample size i.e. both coefficients and standard errors normalize to their true values as the sample size increases. The AMTI – Option 1 shows positive income for the treatment group by 15,971 UGX relative to their control counterpart.

1.3. Analysis of income, disaggregated by income source

The analysis is also conducted for respondents of different income source to understand the variation in income levels between each as well as the comparisons between the treatment and control categories. The first set of findings (table 5) analyzes students who report earning income from wage employment or job. Non-responses[27] are coded as missing and not included in the analysis sample.

Table 14: Income comparisons for students with paid work

Respondents who chose Income Source by Job - 173 Respondents							
Variables	**T**	**Mean-T**	**C**	**Mean-C**	**MeanDiff**	**S.E**	**p-value**
AMTI - Option 1	94	63,277	79	86,942	-23665.387**	11,791	0.02**
AMTI - Option 2	94	43887	79	66180	-22292	13,228	0.04**
Job Income - Option 1	87	68,080	72	95,441	-27360.512	12286	0.01**
Job Income - Option 2	89	46,072	73	71,346	-25273.418	13945	0.03**

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Using both options, the income outcomes are statistically and significantly lower for students in the treatment group than for those in the control group. The average total monthly income option 1 for students in the treatment group was about 24,000 UGX less than for those in the control group ($p<0.05$). Option 1 reveals that the average monthly job income for students in the treatment

[27] 99 missing values and 848 students who receive their income from parents.

group was lower by 27,000 UGX than that of students in the control group ($p<0.05$). Option 2 puts this difference at about 25,000 UGX ($p<0.05$).

From a qualitative aspect, this may be explained by the fact that when students got enrolled into the program, their aspirations were modified. For example, because of improved self-esteem some students were inspired to pursue big careers like law, medicine, etc., which, according to them, need concentrating on studies to pass and get bursaries. This could have reduced the number of time spent at work.

"…many women in Uganda die due to shortage of nurses, but if I make it to being a nurse, I will save people's lives," a nursing profession aspirant said.

More so, some were working just to get experience for their long-term ambitions such as starting their own businesses and not necessarily focusing on the level of the pay.

However, the trend is different for the respondents who reported business as their source of income as illustrated by table 6.

Table 15: Income comparisons for students with personal businesses

Respondents who chose Income Source by Personal Business - 360 Respondents							
Variables	**T**	**Mean-T**	**C**	**Mean-C**	**Mean Diff**	**SE**	**p-value**
AMTI - Option 1	208	81,074	152	61,006	20,068	27,687	0.46
AMTI - Option 2	208	77,376	152	85,928	-8551	22,323	0.35
Monthly Business Income - Option 1	208	81,074	152	61,006	20,068	27,684	0.46
Monthly Business Income - Option 2	208	77,377	152	71,893	5,483	19,239	0.77

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

For students with personal businesses, income outcomes for students in the treatment group are better than those for the students in the control group though not statistically significant. The average monthly total income for the treatment students measure through option 1 is higher by 20,000 UGX. Option 2 still shows higher incomes among treatment students with a difference of 5,000 UGX. This could be because of students opting for business ownership after the Educate! experience who otherwise wouldn't have been involved in business. This is reflected in the number of students who owns a business in treatment in control. The treatment group has 56 more students with business than the control group. Moreover, having a business is financially more rewarding as one is more in control of the operations which ultimately determine the final income.

Table 16: Income comparisons for students with both paid jobs and personal businesses

	Respondents who Income Source by Job & Personal Business - 137 Respondents						
Variables	**T**	**Mean-T**	**C**	**Mean-C**	**MeanDiff**	**S.E**	**p-value**
AMTI - Option 1	92	166,983	45	221,078	-54,095	78,148	0.24
AMTI - Option 2	92	112,585	45	313,152	-200,566	97,990	0.02**
Monthly Business Income - Option 1	92	86,149	45	138,056	-51,907	72,467	0.23
Monthly Business Income - Option 2	92	67,768	45	248,837	-181069	97,015	0.03**
Job Income - Option 1	80	92,959	38	98,316	-5,356	29,933	0.42
Job Income - Option 2	79	52,193	39	74,209	-22,017	15,481	0.07**

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

Considering income from both paid jobs and personal businesses, both options 1 and 2 still indicate that students who are in the treatment group reported lower average monthly total income than those in the control group. Using option one, students in the treatment group earned about 54,000 UGX less than those in the control group. However, the difference is not statistically significant. Using option two, students in the treatment group earned about 200,000 UGX less than those in the control group and these results are statistically significant at the 90% confidence level.
Again, just as it has been highlighted in the beginning of this section , we cannot rely on the results entirely because of the sample issue. But even then, this trend could change positively with time as students with long-term job and business ambitions materialize their dreams.

Table 17: Income comparisons for all students disaggregated by gender for both control and treatment.

Comparing Male & Females (Overall, Both Treatment & Control)							
Variables	**Male**	**Mean1**	**SE**	**Female**	**Mean2**	**SE**	**MeanDiff**
AMTI - Option 1	445	107,191	12,815	225	73,616	19,377	33,575
AMTI - Option 2	445	119,560	15,780	225	67,834	11,580	51726.764**
Monthly Business Income - Option 1	325	88,201	16,103	172	67,495	24,997	20,706
Monthly Business Income - Option 2	325	105,066	20,648	172	59,931	14,487	45,135

Job Income - Option 1	194	98,134	9,222	83	59,392	7,511	38742.454**
Job Income - Option 2	199	68,010	6,812	81	34,470	4,294	33539.989***

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

With both treatment and control groups combined, male students earn more than the female students for both options. However, it is only for option 2 where the difference of 51,727 UGX in the average monthly total income is statistically significant ($p<0.05$). The differences in the average monthly job income are also statistically significant: male students earn 38,742 UGX more than girls for option one ($p<0.05$) and 33,540 UGX more for option two ($p<0.01$).

Table 18: Income comparisons from the three sources for students in the treatment group disaggregated by gender

Comparing Male & Females (Overall, Only Treatment)							
Variables	**Male**	**Mean1**	**SE**	**Female**	**Mean2**	**SE**	**MeanDiff**
AMTI - Option 1	236	104,861	16,194	158	84,978	26,093	19,883
AMTI - Option 2	236	108,853	12,595	158	63,446	14,455	45407.037**
Monthly Business Income - Option 1	174	83,697	18,258	126	81,157	32,455	2,540
Monthly Business Income - Option 2	174	89,111	14,272	126	54,156	17,469	34,955
Job Income - Option 1	110	92,582	14,017	57	55,715	7,148	36866.906*
Job Income - Option 2	112	60,074	9,379	56	26,702	3,856	33372.173**

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

The overall average monthly total income is consistently higher among male students in the treatment group. The average total monthly income is about 20,000 UGX higher for male students when expenses are subtracted, while it is 45,000 UGX higher when the average total income is measured using the second option ($p<0.05$). The average monthly income from business activities is about 35,000UGX higher for male students though this result is not statistically significant while the average income from paid work is for option 1 and option 2 are higher in the male category by 33,000 UGX ($p<0.1$)and 36,000 UGX ($p<0.05$) respectively.

Table 19: Income comparisons from the three sources for students in the control group disaggregated by gender

Comparing Male & Females (Overall, Only Control)							
Variables	**Male**	**Mean1**	**SE**	**Female**	**Mean2**	**SE**	**MeanDiff**
AMTI - Option 1	209	109,822	20,292	67	46,822	21,089	62999.711*
AMTI - Option 2	209	131,651	30,464	67	78,181	18,814	53,470
Monthly Business Income - Option 1	151	93,391	27,607	46	30,072	28,657	63,319
Monthly Business Income - Option 2	151	123,451	41,319	46	75,747	25,543	47,704
Job Income - Option 1	84	105,405	10,850	26	67,452	18,330	37952.839*
Job Income - Option 2	87	78,226	9,799	25	51,870	10,226	26,356

Statistical significance is indicated as follows: * = Significant at 90%, ** = Significant at 95%, *** = Significant at 99% confidence level

In the control group, male students earn more than female students. However, only differences in the average monthly total income (63,000 UGX more) and the average monthly income from paid work (38,000 UGX more) for option 1 are statistically significant.

One thing that is common in all the three gender tables is the positive difference in all income categories between males and females making males earn more than females in all three scenarios. We have already established that those in the treatment group are more likely to have jobs, businesses and both jobs and business. Table 11 further disaggregates this positive change by gender and suggests that the rate at which males and females are likely to engage in jobs, businesses, and both jobs and businesses is much higher for treatment males than for treatment females. For instance, males in the treatment group are 4.76% more likely to have jobs[28] whereas females in the treatment group are only 1.17% likely to have jobs. Similarly, males in the treatment group are 9.02% more likely to have both a business and a job whereas females in the treatment group are only 5.3% more likely to have both a business and a job relative to females the comparison group. The only exception to this is business ownership – in which females in the treatment group are more likely to have businesses[29] than males in the treatment group. The reliance on parents for money is still high for females (62%) even in the treatment group. This coupled with high rates for job and both job and business is why males earn higher than females in all income categories. The high rate

[28] Relative to the males in the control group.
[29] Relative to the females in the control group.

for females in business is reflected in them performing better than males in other outcomes of the program which includes among others leadership score, skills score and no of skills.

Table 20: Comparison of earnings between male and female students at end of course (%)

Table – B (784 males – 734 females)	**Treatment**			**Control**		
	Male	Female	Total	Male	Female	Total
Job	17.97	7.73	12.38	13.21	6.56	10.41
Parents	31.59	61.84	48.09	52.39	79.06	63.64
Business	32.75	22.95	27.4	25.74	12.19	20.03
Both Job and Business	17.68	7.49	12.12	8.66	2.19	5.93
Total	100%	100%	100%	100%	100%	100%