ETON CONNECT

INNOVATING & INSPIRING THROUGH PARTNERSHIP

# Building academic resilience: A study with Year 12 students

October 2021

Dr Iro Konstantinou & Dr Jonathan Beale

CIRL

Tony Little Centre for Innovation & Research in Learning

4

INTRODUCTION 4

LITERATURE REVIEW 5

What is academic resilience? 5

Character skills associated with academic resilience 6

Why is academic resilience important? 8

DATA COLLECTION 9

FINDINGS: QUALITATIVE DATA 10

Transition to sixth form 10

Developing the skills to be resilient in academic settings 10

The impact of Covid-19 11

Is learning about resilience important? 11

FINDINGS: QUANTITATIVE DATA 12

Control group 12

Experiment group 13

Resilience scale (experiment group) 16

Academic resilience scale (experiment group) 18

Resilience scale (control group) 19

Academic resilience scale (control group) 19

# Report overview

In the academic year 2020-2021, Eton College and the Tony Little Centre worked with a sixth form college in south London to implement a programme of developing academic resilience. We are confident that our course contributed to the students' resilience and academic resilience.

The sessions we designed revolved around four main themes:

1. Becoming a self-regulated learner
2. Self-efficacy, time management and avoiding procrastination
3. Developing mastery
4. Building capabilities

Our qualitative data collection showed that:

- Students were very aware of the challenges of transitioning to sixth form and how this would affect their performance and ability to cope.
- Becoming independent learners, managing their time, and setting priorities were all skills they believed they needed to develop.
- School closures because of Covid-19 resulted in many gaps to their knowledge and lost educational opportunities. However, the situation also accelerated their maturity in dealing with difficult emotions and situations.
- Being taught how to be resilient was not seen as important by everyone. Students believed resilience was built based on situations they had to deal with. However, learning about the psychology behind reactions and emotions as well as strategies of overcoming challenges was welcomed by students.

We used the Academic Resilience scale and the Resilience scale to collect quantitative date. Descriptive statistics and linear regression analysis showed that the course has benefitted students to develop resilience and academic resilience.

Our recommendations are:

- Introduce explicit teaching of resilience and relevant character skills which students can draw on to overcome school challenges.
- Ensure the examples given and the materials used resonate with the life experiences of students.
- Focusing on the science and facts behind how resilience can be developed is an important element of any intervention schools may want to introduce.

**If you want to use our materials with your Year 12, please get in touch.**

## Introduction

In the academic year 2020-21, we worked with an inner-city London sixth form college which has three sites. The sites are in areas of London with high deprivation and attract students from a diverse range of ethnic backgrounds and religions. Currently, 87% of students are from ethnic minority groups and over 20% are on free school meals. The students are mostly drawn from local areas in south-east London and all join the College for the last two years of their secondary education, to be prepared for their A Level examinations. So, the students in the intervention came from a variety of different schools and educational backgrounds prior to joining the College.

The course was aimed at students aged 16-17 years, in their penultimate year of secondary school and first year of A Level study (Year 12). The senior leadership team overseeing one of the College's sites identified this year group as being in particular need of a course aiming to build Academic Resilience (AR). The leadership team observed that Year 12 students had tended in previous years to lack resilience in academic contexts, indicated by factors such as becoming quickly demotivated to persevere in the face of academic challenges. Even though students tended to be 'street savvy', growing up in inner city London, they were not always equipped to manage the increasing pressure and stress brought about by their academic studies. The leadership team reported that this often resulted in students losing motivation or not meeting their potential.

Based on research on the factors that most influence AR, we developed a programme which would run for almost a full academic year. The College has a tutorial system where students meet with their tutor for around 20 minutes each day. Our course consisted of 20 sessions which could be covered in two of each week's tutorial sessions. The core sessions included reading exercises, reflective activities, discussions, and tutor-led debates. The sessions revolved around four main themes:

5. Becoming a self-regulated learner
6. Self-efficacy, time management and avoiding procrastination
7. Developing mastery
8. Building capabilities

These themes explored topics including character strengths, metacognition, independent learning skills, reflection, motivation, goal setting, and moving beyond one's comfort zone. The focus of the sessions was to develop AR and related skills that would better equip students to manage issues related to their academic work. While the sessions were designed prior to the Covid-19 pandemic, they were particularly useful in encouraging students to reflect on their strengths and understand how challenges can be overcome.

## Literature review

### What is academic resilience?

To be resilient means to be robust and adaptable in the face of adversity: to be able to resist being affected by difficulties, and when we cannot help being affected, having the ability to 'bounce back' quickly. The American Psychological Association defines resilience as the process of '"bouncing back" from difficult experiences', or, more specifically, 'the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress' (APA, 2012). This broad concept of resilience is also known as psychological resilience. Resilience is widely considered an asset, character virtue or strength which is likely to positively impact a person's performance, achievement, health and well-being. Resilience is associated with increased quality of life, well-being and functional capacity in times of adversity (Cassidy, 2015 & 2016; Martin & Marsh, 2006 & 2009). Research suggests that resilience positively impacts well-being; optimism; confidence; self-improvement; positivity of self-image; problem-solving skills; and the development of character skills such as perseverance and motivation (Cahill, Beadle, Farrelly, Forster & Smith, 2014). Mihaly Csikszentmihalyi describes 'the ability to persevere despite obstacles and setbacks' – i.e., resilience – as 'probably the most important trait not only for succeeding in life, but for enjoying it as well' (Csikszentmihalyi, 2002, p. 24).

Research on resilience in the context of education refers to a specific kind known as 'educational' or 'academic resilience'. AR is a student's ability to deal effectively with and adapt to academic challenges and adversity in academic settings, and their capacity to overcome

chronic or acute adversities in academic settings that could constitute major impediments to academic success (Martin & Marsh, 2009, p. 353). AR was posited to provide a context-specific form of psychological resilience that can be studied in research on resilience, particularly in psychology and education studies (Cassidy, 2016, p. 1). It is a construct made up of several psychological elements, each of which can be measured and is included in accounts of AR based on evidence suggesting that each element contributes towards AR. Academically resilient students are those who succeed academically despite adverse conditions (Waxman et al., 2003; Cassidy, 2015, p. 2), and more specifically those who maintain 'high levels of achievement, motivation and performance despite the presence of stressful events and conditions that place them at risk of doing poorly in school and ultimately dropping out of school' (Alva, 1991, p. 19, quoted in Martin & Marsh, 2009, p. 355).

## Character skills associated with academic resilience

Research suggests that five character skills are significantly correlated with and significant predictors of AR: self-efficacy; a sense of control; effective planning skills; perseverance; and low anxiety. Studies suggest that resilient students are skilled in self-efficacy, perseverance and planning, have a good sense of control and low anxiety (Martin & Marsh, 2006, p. 276). Based on these studies, Martin & Marsh (2006) propose what they call a '5-C' model of AR, where AR is a construct made up of those factors:

1. self-efficacy (which they also term 'confidence');
2. co-ordination (i.e., planning skills);
3. a sense of control (e.g., over academic work or academic success);
4. composure (i.e., low anxiety);
5. perseverance (which they also term 'commitment') (ibid., p. 267).

All of these are character skills which can be measured and developed. The 5-C model suggests that interventions that attempt to build AR should aim to develop students' self-efficacy, sense of control, perseverance and planning skills, and reduce their anxiety (ibid., p. 277).

While all five are significant AR predictors (ibid., p. 273), studies suggest that three are more significant: anxiety, self-efficacy and a sense of control. Some skills, such as a sense of control, are particularly important for enhancing students' skills in specific areas related to AR or students' academic skills more widely.

Anxiety is the strongest predictor, as a negative factor: a lower level of anxiety correlates with and predicts higher AR (ibid., p. 274). Another significant predictor is self-efficacy – the belief we have in our ability to meet the challenges we face and successfully complete the tasks we need to (Akhtar, 2008; Bandura, 1977, 1986 & 1997). Studies in education suggest that differences in students' self-efficacy are better performance predictors than ability or previous achievement and seem particularly important when individuals face adversity (Cassidy, 2015, p. 3). Research on AR suggests that,

- self-efficacy is an 'important contributory factor for resilience' (Cassidy, 2015, p. 8, based on studies by Hamill, 2003 and Martin & Marsh, 2006);
- 'having positive self-efficacy beliefs is likely to contribute toward increased resilience in students' (Cassidy, 2015, p. 8);
- self-efficacy is an important characteristic that distinguishes resilient and non-resilient students aged 16-19 (Hamill, 2003, cited in Cassidy, 2015, p. 3);
- where students have positive beliefs about their self-efficacy, this 'is likely to contribute toward increased resilience' (Cassidy, 2015, p. 8);
- 'academic self-efficacy' is correlated with and is a 'significant predictor' of academic resilience (Martin & Marsh, 2006, p. 277).

A striking finding concerning self-efficacy is that differences in how individuals perceive self-efficacy 'have often been shown to be better predictors of performance than previous achievement or ability' and seem 'particularly important when individuals face adversity' (Cassidy, 2015, p. 3; Cassidy, 2012). In one study, students with higher self-efficacy reported significantly higher AR (Cassidy, 2015, p. 8). Following a 2015 case study of 435 undergraduates on the link between 'academic self-efficacy' and AR, Cassidy suggests that self-efficacy training offers a fruitful means of building AR (Cassidy, 2015, p. 13). He states that self-efficacy is a resilience factor worthy of further study in so far as it may distinguish resilient and non-resilient individuals (2015, p. 3). He notes that relatively little work has examined how self-efficacy relates to resilient behaviours exhibited in response to adversity. The development of self-efficacy has formed an important part of some interventions (e.g., Cassidy, 2015 and Martin & Marsh, 2006) and was an area of focus in our intervention.

Developing a student's sense of control, for example over their academic success, is pivotal for addressing issues concerning a student's disengagement, with academic work or some specific area of academic life. Studies show that chronically low levels of control among students leave them disengaged and sometimes result in them 'giv[ing] up to the point of not even trying to avoid failure' (Martin & Marsh, 2006, p. 278; Peterson, Maier & Seligman, 1993). Such students believe they have little or no sense of control over their academic outcomes,

exhibit a 'helpless pattern of motivation' and a general sense of disengagement (Martin & Marsh 2006, p. 278; Covington, 1992).

## Why is academic resilience important?

Resilience is widely considered a character strength that is likely to positively impact a person's health, well-being, performance and achievement (Cassidy, 2016, p. 2). Studies show that resilience is associated with increased quality of life, well-being and functional capacity in times of adversity, and resilience is a significant predictor of how students cope at university (*loc. cit.*, based on a study by McLafferty et al., p. 2012). Those research findings concern psychological resilience. Current research on resilience in students tends to focus on psychological resilience rather than AR. Studies show that developing AR can improve students' chances of academic success and support their well-being. It can also help prepare students to cope with and recover from adversities that risk impeding their academic success. Studies also show that,

- there is a positive relationship between AR and academic achievement (Cassidy, 2016, p. 2, based on a study by Fallon, p. 2010);
- the increased vulnerability to mental illness among university students 'implies low resilience in coping with academic stress and change' (Cassidy, 2016, p. 2);
- AR is a strong predictor of enjoyment of school, class participation, and general self-esteem (Martin & Marsh, 2006, p. 277).

Developing students' resilience has been recognised as a vital component of character education and resilience has become a staple part of some character education programmes. Wellington College has taught resilience as a timetabled subject since 2006 (BBC News, 2014). Resilience occupies a prominent place in school inspection frameworks: the UK school inspection bodies, the Office for Standards in Education, Children's Services and Skills (Ofsted) and the Independent Schools Inspectorate identify resilience as one of the character traits they monitor when assessing schools' provision of students' personal development. All these initiatives focus on psychological resilience rather than AR, though. To better target the specific difficulties that students face, educational interventions and initiatives should focus additionally or instead on AR. An example of an initiative that focuses on AR is Stanford University's 'Resilience Project', which began in 2011 (Stanford, 2018).

AR is important for all students. As Martin & Marsh note, AR is 'relevant to all students because at some point all students may experience some level of poor performance, adversity,

challenge, or pressure' (*ibid*., p. 267). Students need to be resilient to adapt their methods of learning or working in the face of academic challenges or setbacks in order to improve. This often requires academic buoyancy (AB) rather than AR. It is difficult to say which is more important: while AB- students' ability to successfully deal with academic setbacks and challenges that are typical of the ordinary course of school life (e.g., poor grades, competing deadlines, exam pressure, difficult schoolwork) (Martin & Marsh, 2008) - is needed more of the time by greater numbers of students, the potential risks for those who lack AR are greater if they encounter significant adversity in academic contexts. It is not yet clear whether or to what extent the development of AB supports the development of AR, or vice versa. It is also not clear how AR is connected to psychological resilience – for example, whether or to what extent being highly psychologically resilient makes a person academically resilient, or how developing AR could develop psychological resilience. Moreover, it is not yet clear how AR and AB relate to certain character skills particularly relevant to resilience, such as grit, motivation and determination, or where they fall on a web of types of resilience in relation to other character skills. Research in these areas could build upon Martin and Marsh's 5-C model. All of these are important areas on which future research should focus.

## Data collection

In total, around 90 students took the course and 10 acted as a control group. We collected data using a mixed methods approach. We used two standardised scales, the ARS-30 (30 items) and a scale on psychological resilience, CD-RISC (10 items). This score for resilience ranges between 0-40 and for academic resilience ranges between 5-150. The higher the scale, the more resilient students have been. We collected pre and post survey data from 47 students (n=47) who took part in the course and seven (n=7) were part of the control group. We also held focus groups before and after students participated in the course. The same students took part in both focus groups (five in the first and four in the second). We used the focus groups to better understand how students found the course and whether they thought it helped them with their approach to overcoming academic challenges.

## Findings: qualitative data

### Transition to sixth form

This was a pilot study and there are many adjustments we would make to this course ahead of its further implementation in future years. Yet, even from this study we gathered some interesting data which can help us refine the course and offer it to more students and schools. Students were acutely aware of the differences between academic life during secondary school (11-16 years of age) and the sixth form (16-18). They reported that this was a cause of stress for them because the fast pace of the new syllabi and the difference in academic environments had made it challenging to settle in. They realised more than in previous years that they could not be shy in class by avoiding asking questions because this would hold them back. Some students said that this was in conflict to their character, which was among the reasons they found the transition to sixth form difficult. Some said that the experience of commencing A Level studies had been a difficult learning curve and they needed to learn quickly how to manage new ways of learning, particularly the need for a greater level of independent study.

Many students said that during previous years of school they felt they were among the cleverest in their cohort and through this they had developed the confidence to navigate the system. These students reported that this confidence was challenged upon entering a college in which they were among students who they believed were as bright or brighter than them. Joining a new institution meant that they needed time to adapt and learn new systems, processes, and form new relationships with their teachers and friendships with their peers. This process made them lose confidence or held them back in participating. They reported that this had led to them questioning their abilities and feeling lower self-esteem. This was a common theme in the data from students who repeatedly said they felt they were wrong even when they knew the answer.

### Developing the skills to be resilient in academic settings

A particular area where students noticed a difference in the new challenges of the sixth form was the need to be independent learners. Students reported that they felt that in the sixth form teachers were less accommodating to their needs and spent less time breaking down material to be learned. Students said that teachers would not be as patient with them as they had experienced in previous school years, nor would teachers be as attentive to possible gaps in their learning. Students said they had become aware that they needed to show more initiative

and ask questions if they did not want to be left behind. This did not come easily to a lot of them, because some were shy or did not want to ask questions in front of their peers. They quickly had to develop the confidence to be able to do this.

Other areas students identified as important for academic success in the sixth form were managing their time and workload; being able to plan their own time; and setting priorities. These included deciding whether to relax at the weekend or revise, or how to balance their time between socialising and keeping up with work.

## The impact of Covid-19

It was interesting to see how students reflected on the need, and their ability, to be resilient during the school closures enforced in response to Covid-19. Students mentioned that school closures had resulted in the cancellation of many external opportunities, such as educational trips and guest speakers. They were worried that this would impact their ability to prepare for university and the workplace. A lot of the emphasis during closures was on subject knowledge and revision. Students reported that this took away some of the additional things which add to a sixth form experience and can provide them with important skills in preparation for university and the workplace.

When asked to describe further their experiences brought about by school closures, students generally said they had been forced to become more resilient. Students said they had developed the ability to keep their emotions in check and not let emotions dictate their behaviour. One student gave the example that if you do badly in a test, you need to keep the bigger picture in view and try to not let the performance affect you. Students also said that they realised that when you feel stressed or anxious because of a bad situation, things can spiral out of control and this can affect those around you, and you can also be affected by others. All of this needed to be kept in check to ensure that bad situations did not get even worse.

Students felt that the lockdowns had been tough for them and had created a lot of gaps in their knowledge. They felt that the lockdowns had reduced their confidence. Lack of contact with their social networks was difficult and even though as time passed they regained some lost learning, they still did not think that everything they needed to cover for their courses could be covered in the remaining time available.

## Is learning about resilience important?

Another area we explored was whether students needed to be *taught* how to be resilient. Looking at the responses about how they coped during Covid-19, it could be inferred that students can be resilient when needed. However, students mentioned the need for explicit instruction of what it takes to be resilient and how to learn from mistakes and failures. One respondent said that showing resilience comes naturally to many people but through talking about it and being given examples you can see what resilience looks like in different contexts and from different perspectives. Moreover, by looking at the literature behind some concepts you can get a better understanding of how the brain works or how people work so you can draw on that knowledge when needed. Learning how to become and stay confident was one of the main areas that students felt could help them with their overall academic performance as well as their general outlook. They believed that if this could be taught, they could tackle a lot of the challenges they were faced with because of Covid-19 but also more widely.

Not all students believed that resilience, academic or otherwise, can be taught. Some suggested that it is something you pick up from experience and from observing those around you. One student said that if someone from a completely different background tried to talk to you about overcoming challenges it would not resonate compared to hearing it from someone who felt closer to you. Another said that whatever materials or resources they would be asked to cover needed to draw on people and situations that was relevant to them and resonated with their own circumstances, which generally meant their socioeconomic and cultural background. One said that this is why sometimes listening to stories about or seeing examples of resilience from parents or relatives can be as powerful as reading an article on resilience or learning about a famous person who exemplifies resilience.

## Findings: quantitative data

### Control group

As shown in table 1, the resilience score for students has dropped. The median score at the beginning of the year was 25 and at the end of the year has dropped slightly to 24. The range of the score and subsequently the standard deviation among the students in the control group

has increased at the end of the year, demonstrating that the students' scores are dispersed – some of the students were far less resilient than others.

*Table 1: Summary of descriptive statistics measuring resilience for the **control group** (pre- and post-test scores)*

| | Minimum | Maximum | Mean | Median | Std. Deviation | Variance |
|---|---|---|---|---|---|---|
| Resilience score (Pre-test) | 15.0 | 31.0 | 24.1 | 25 | 5.5 | 30.5 |
| Resilience score Post-test | 6.0 | 34.0 | 23.4 | 24 | 8.5 | 72.6 |

*(n=7)*

On the contrary, the result for the academic resilience scale shows that the median score for students has increased significantly. The median score for academic resilience was 68 and increased to 73 by the end of the year. The difference between the minimum and maximum score, and subsequently standard deviation, has decreased, showing that students' scores for academic resilience are becoming more concentrated and centred. This could be explained by the fact that students became more accustomed to new independent style of learning which is associated with A Levels as discussed in the qualitative data above.

*Table 2: Summary of descriptive statistics measuring academic resilience for the **control group** (pre- and post- test scores)*

| | Minimum | Maximum | Mean | Median | Std. Deviation | Variance |
|---|---|---|---|---|---|---|
| Academic Resilience score (Pre-test) | 54.0 | 99.0 | 72.6 | 68 | 14.8 | 219.9 |
| Academic Resilience score (Post-test) | 60.0 | 100.0 | 74.8 | 73 | 12.3 | 152.1 |

*(n=7)*

## Experiment group

The median and mean of the resilience score has remained the same throughout the year (mean of 26.7 and median of 27), but the difference between the min and max score as well as the standard deviation has reduced. In other words, the results show that the course might have been beneficial to students' levels of academic resilience.

*Table 3: Summary of descriptive statistics measuring resilience for **the experiment group** (pre- and post- test scores)*

| | Minimum | Maximum | Mean | Median | Std. Deviation | Variance |
|---|---|---|---|---|---|---|
| Resilience score (Pre-test) | 13.0 | 40.0 | 26.7 | 27.0 | 5.9 | 34.4 |
| Resilience score Post-test | 14.0 | 35.0 | 26.7 | 27.0 | 4.7 | 22.7 |

(n=47)

The academic resilience scale for the experiment group shows that the median score for students has increased slightly throughout the year, from 75 to 76. The difference between the minimum and maximum score, and subsequently standard deviation, has also decreased, showing that students' scores for academic resilience are becoming more concentrated and centred at the end of the year.

*Table 4: Summary of descriptive statistics measuring academic resilience for the **experiment group** (pre- and post- test scores)*

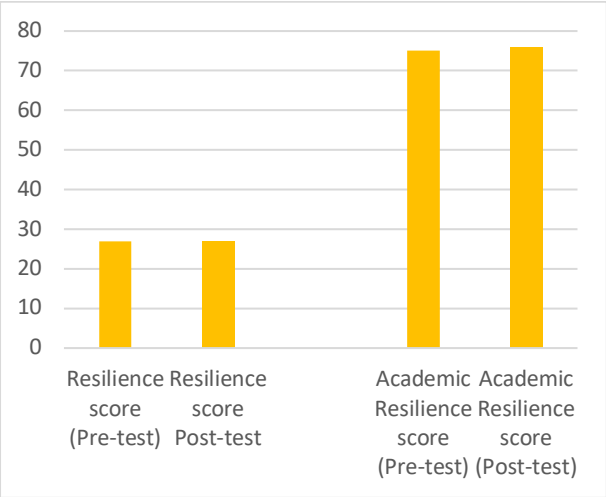
| | Minimum | Maximum | Mean | Median | Std. Deviation | Variance |
|---|---|---|---|---|---|---|
| Academic Resilience score (Pre-test) | 57.0 | 124.0 | 75.4 | 75.0 | 11.2 | 125.0 |
| Academic Resilience score Post-test | 56.0 | 99.0 | 76.0 | 76.0 | 9.1 | 82.1 |

(n=47)

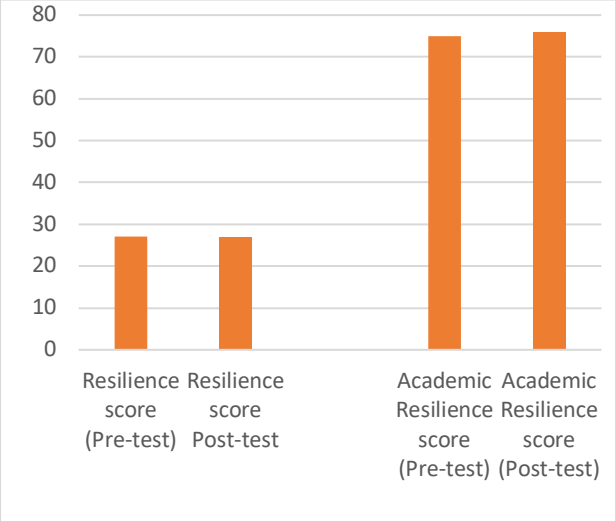
The figure below illustrates this difference in the resilience score between these two groups of students. Yet, we need to figure out if these differences in scores are systematic, statistically significant, or are caused due to random differences, both within each group and then between the two groups of students. In other words, our hypothesis is that the course has been beneficial on resilience and academic resilience.

*Figure 1: Comparison of the median score for resilience and academic resilience scores between the experiment and control group (pre- and post- sores)*

Experiment group




Control group

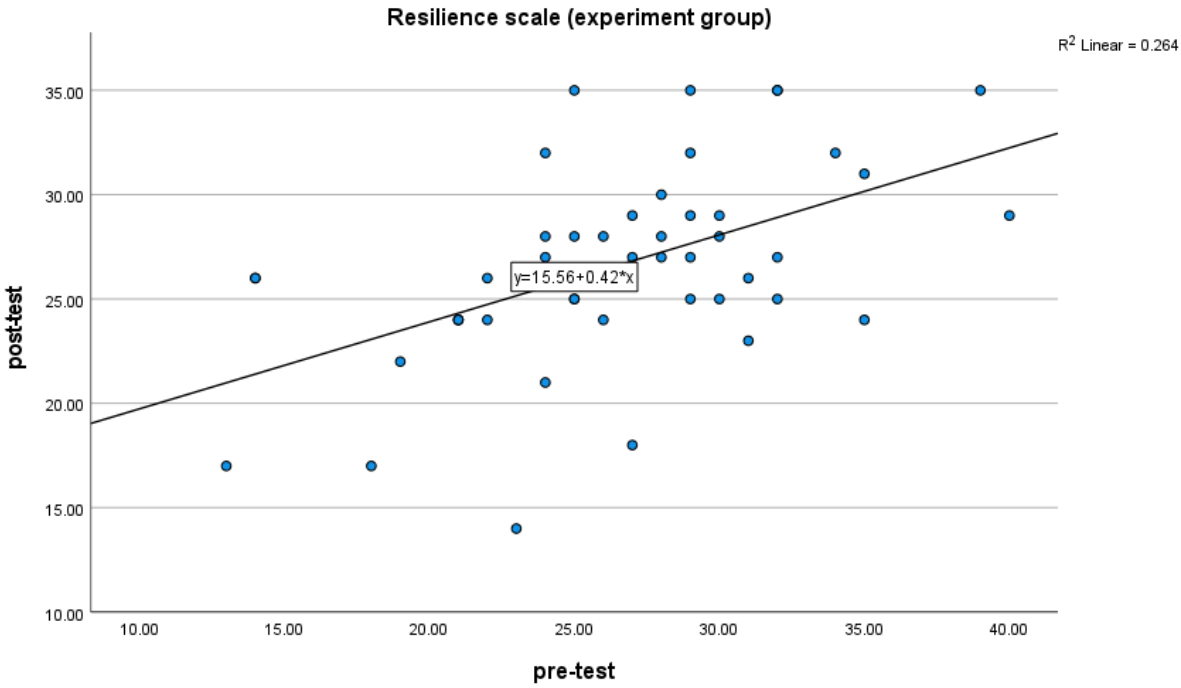



To understand if the changes in the scores, both in the control and experiment group, are statistically significant, a linear regression analysis is used. This method of analysis is commonly used in the analysis of Randomised Control Trials (RTCs). However, our limitation in using this method in this report is the low number of students in the control group. Therefore, this report has paid a close attention to the experiment group and analysis of changes in their scores.

In carrying out this analysis, the result of each score at the pre-test stage is considered as the independent variable and the score at the post-test stage is considered as the dependent variable. The aim is to understand if the changes in the dependant variable (post-test score) are because of the changes in the independent variable (post-test score). If this association between the pre-test and post-test scores is not strong, it indicates that most of the changes in the post-test scores are not associated with the pre-test scores and there have been other variables, including the course, which have had an impact. In other words, the researcher's hypothesis with 95% confidence level will be accepted.

The analysis for the experiment group, for the resilience and academic resilience scale, shows that some of the variations in the post-test scores are dependent on the pre-test scores – their answers at the beginning of the year. The scatterplots in figures 2 and 3 show that the relationship, correlation, between pre- and post-test scores is linear. This linear correlation is presented by the best fit line, our best statistical model to represent the relationship between the pre- and post- test scores.

*Figure 2: Scatter plot of the Resilience scores at pre- and post- test for students in the experiment group with line of best fit*




## Resilience scale (experiment group)

As can be seen in the tables below, the R square for the model is equal to 0.26. Here, the score of 0.26 for R square shows that there is not a strong relationship between the pre-test and post-scores for the resilience scale. This means that the scores that the students have gained at the end of the year (post-test scores) are not strongly related to their scores at the beginning of the year (pre-test scores). Therefore, the course might have played a role in their post-test scores. The table of coefficients also shows the estimated parameters for the model and that they are statistically significant (sig= 0.00). Moreover, the Beta coefficient (B) in this table is also equal to 0.417 indicating that only around 40% of the variations in the post-test scores are related to the pre-test scores and the course. To be precise, with 95% confidence, it can be argued that the course has had an impact on students' resilience and academic resilience.

*Table 5: Output for the linear regression analysis, resilience scale of the experiment group*

**Model Summary**

| Model | R<br>group = Experiment group (Selected) | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .514[a] | .264 | .248 | 4.12863 |

a. Predictors: (Constant), pre-test

**ANOVA[a,b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 275.163 | 1 | 275.163 | 16.143 | .000[c] |
| | Residual | 767.050 | 45 | 17.046 | | |
| | Total | 1042.213 | 46 | | | |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Experiment group

c. Predictors: (Constant), pre-test

**Coefficients[a,b]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 15.564 | 2.832 | | 5.497 | .000 |
| | Pre-test | .417 | .104 | .514 | 4.018 | .000 |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Experiment group

## Academic resilience scale (experiment group)

Similar results can be found for the Academic Resilience scale. R square is equal to 0.36 which again shows that there is not a strong relationship between the pre-test and post-scores for the academic resilience scale. Table of coefficients here also shows the estimated parameters for the model and their statistical significance (sig= 0.00). Moreover, the Beta coefficient (B) in this table is also equal to 0.488 indicating that only around 49% of the variations in the post-test scores is related to the pre-test scores and the other 51% of the variations is related to other variables including teachers' training programme.

*Table 6: Output for the linear regression analysis, academic resilience scale of the experiment group*

**Model Summary**

| Model | R<br>group = Experiment group (Selected) | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .602[a] | .362 | .348 | 7.31482 |

a. Predictors: (Constant), pre-test

**ANOVA[a,b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1368.119 | 1 | 1368.119 | 25.569 | .000[c] |
| | Residual | 2407.796 | 45 | 53.507 | | |
| | Total | 3775.915 | 46 | | | |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Experiment group

c. Predictors: (Constant), pre-test

**Coefficients[a,b]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 39.243 | 7.355 | | 5.335 | .000 |
| | Pre-test | .488 | .096 | .602 | 5.057 | .000 |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Experiment group

## Resilience scale (control group)

Undertaking a similar linear regression analysis for the control group indicates that the estimated parameters for the model for the resilience scale are not statistically significant (sig= 0.02), and it can be interpreted that the changes in the scores at the pre-test and post-test stages are due to random factors and are not systematic changes. This issue can also be the result of having a small number of students in the control group. Therefore, here, we mainly focus on the academic resilience scale for the control group.

*Table 7: Output for the linear regression analysis, resilience scale of the control group*

**Coefficients[a,b]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -7.542 | 9.476 | | -.796 | .462 |
| | precomp | 1.283 | .384 | .831 | 3.341 | .021 |

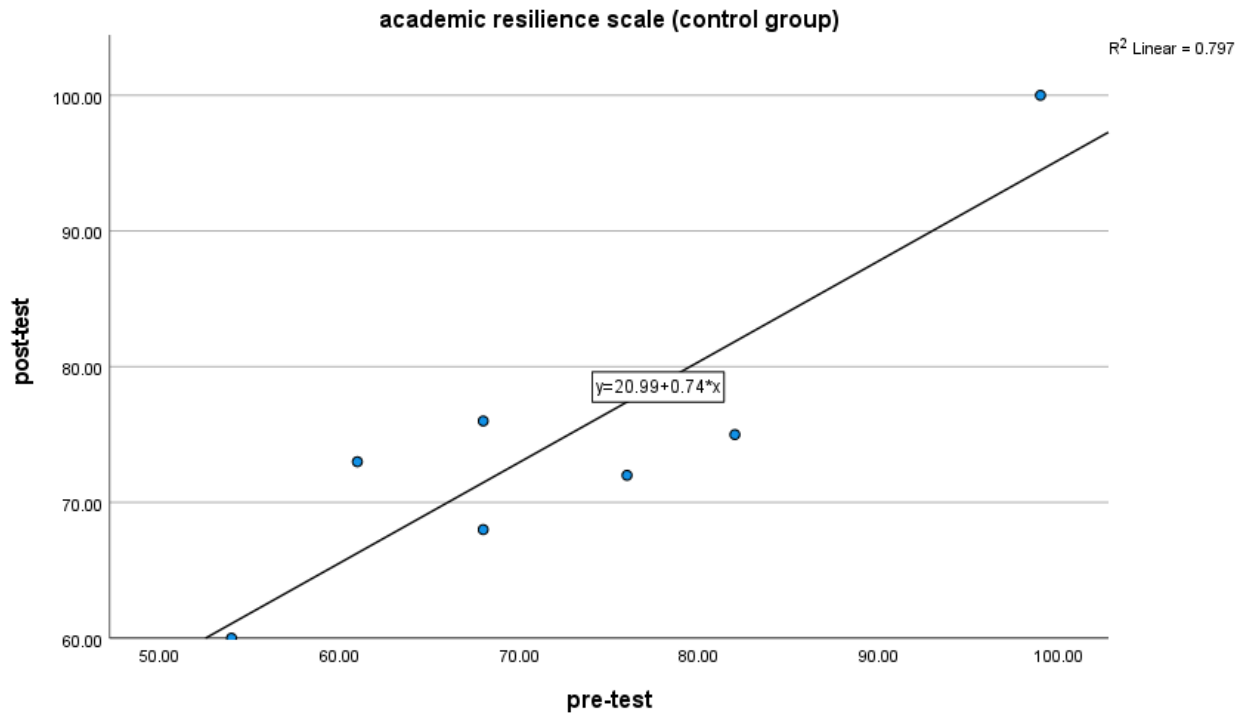
a. Dependent Variable: post-test

b. Selecting only cases for which group = Control group

## Academic resilience scale (control group)

As shown in figure 4, variations in the post-test scores for the academic resilience scale is dependent on the pre-test scores – students' answers at the beginning of the year. The scatterplot shows that the relationship between the pre- and post-test scores is linear. This linear correlation is presented by the best fit line.

*Figure 4: Scatter plot of the academic Resilience scores at pre- and post- test for students in the control group with line of best fit*




The R square in this model is equal to 0.79 showing that there is a strong correlation between the pre- and post- test scores. The estimated parameter for the model (B) is statistically significant (sig= 0.007) in the coefficient table shown below. More importantly, Beta, in this table, is equal to 0.74 suggesting that around 74% of the changes in the post-test scores for the students in the control group is due to the changes in the pre-test scores. In other words, only 26% of the changes in the score of the students at the end of the year is related to other factors such as teaching etc. This result is more clearly presented in figure 4.

*Table 8: Output for the linear regression analysis, academic resilience scale of the control group*

**Model Summary**

| Model | R<br>group = Control group (Selected) | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .892[a] | .797 | .756 | 6.09525 |

a. Predictors: (Constant), pre-test

**ANOVA[a,b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 727.097 | 1 | 727.097 | 19.571 | .007[c] |
| | Residual | 185.760 | 5 | 37.152 | | |
| | Total | 912.857 | 6 | | | |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Control group

c. Predictors: (Constant), pre-test

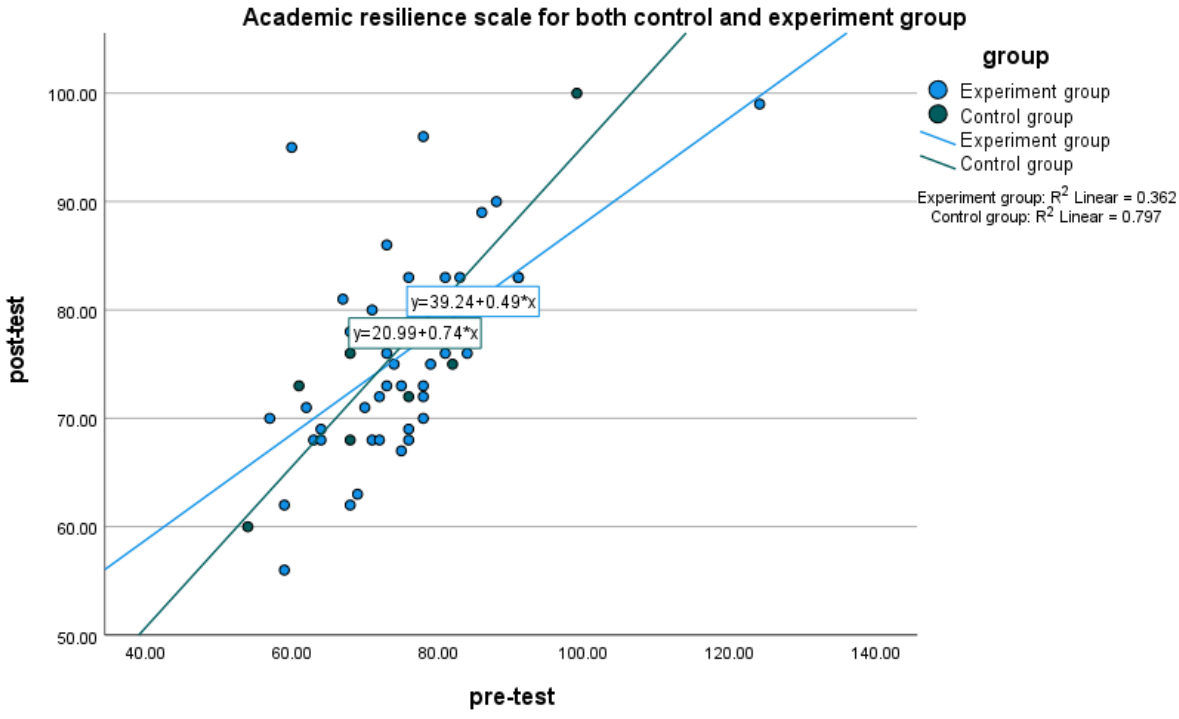
**Coefficients[a,b]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 20.990 | 12.392 | | 1.694 | .151 |
| | Pre-test | .742 | .168 | .892 | 4.424 | .007 |

a. Dependent Variable: post-test

b. Selecting only cases for which group = Control group

*Figure 4: Scatter plot of the academic resilience scores at pre- and post- test for students in the control and experiment group with line of best fit*




As the figure above shows, the scores in the pre- and post- tests for the academic resilience scale are correlated with each other for both the control and experiment group. However, this correlation in the control group is stronger suggesting the smaller effectiveness of other

variables on the students' scores. In other words, the course in might have been beneficial to the students in this group compared to the control group. The variable that mainly determines the changes in the scores of the control group is their scores at the beginning of the year: the lower R square in the experiment group suggests the benefit of the course on their academic resilience scores. To summarise, the analysis of the data on the resilience and academic resilience score among and between the students in the control and experiment group, demonstrates that the course has played a role in reducing the association between the pre-test and post-test score and has benefitted the students in the experiment group. Therefore, the researcher's hypothesis is accepted with 95% confidence level.