

**STEM VS. HUMANITIES:****WHY BOTH ARE NECESSARY FOR A BALANCED EDUCATION**

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ABSTRACT

In light of the current disputes over whether subjects should take priority—the STEM (science, technology, engineering, and mathematics) or the humanities—this new research emphasises the necessity of a more sophisticated approach to education and career preparation. Our research contradicts earlier studies by showing that economic and social benefits provided by particular sectors are less important for an individual's well-being than the perceived compatibility between their interests and their chosen major or career path. Out of 8,151 college graduates nationwide, there was no statistically significant difference in the levels of pleasure at work, life satisfaction, or financial satisfaction between STEM and humanities majors. Our research shows that interest match better reflects these characteristics. Afterwards, researchers surveyed 636 alumni of a public Midwest institution and found that these patterns persisted after controlling for traits related to aptitude and personality. Given these results, it's reasonable to assume that the STEM fields and the arts and humanities both contribute significantly to societal progress and personal fulfilment alike. Thus, instead of seeing them as competing goals, educational and professional assistance should stress the importance of integrating one's own interests with one's academic and career aspirations in both areas. A more balanced and enjoyable learning environment for the learner will be the end consequence of this.

Keywords: *Interest Fit, Major Field, STEM vs. Humanities, Work Satisfaction, Life Satisfaction, Financial Satisfaction, Personal Income, Well-being Outcomes, Relative Weight Analysis (RWA), Regression Analysis, Educational Fit, Career Alignment, Subjective Well-being*

INTRODUCTION

There has been tension between STEM (science, technology, engineering, and mathematics) education and arts and humanities curricula all through the twenty-first century. The STEM fields are highly prized by many, including parents, school administrators, and politicians, who believe in their importance for national development, innovation, and success in today's technology-driven job market [1]. Worryingly, this prioritisation might lead to the loss of funding and attention for the arts and humanities, which are seen as less practical and economically significant. In contrast, this oversimplified view ignores the interconnectedness of the two domains, which is why it does nothing to promote holistic development in people and communities. Education in the arts and humanities and education in the STEM fields should not be seen as competing goals, but as complementary parts of a well-rounded educational system.

An education in the humanities gives students the opportunity to develop skills such as critical thinking, empathy for others, effective communication, and ethical reasoning [2]. These are all skills that are necessary for leaders and responsible citizens to possess. Those kids, on the other hand, who take part in STEM programs are able to gain the information, abilities, and attitudes that are necessary to address difficult scientific and technical challenges. According to [3], the rapid growth of fields such as artificial intelligence (AI), biotechnology, and environmental research need not only the knowledge of technology, but also moral judgement and social awareness. The humanities give vital guidance in these areas with their expertise. During the COVID-19 pandemic, efforts were made to emphasise a number of important topics, including scientific innovation, ethical public health communication, and legislation that is culturally appropriate. [4] emphasise the fact that the intrinsic value of STEM and the humanities is not the greatest predictor of individual enjoyment and success; rather, it is the alignment of personal interests with chosen disciplines that is the most important factor.

Regardless of whether they majored in science, technology, engineering, or the arts, college graduates who had a strong feeling of interest fit reported higher levels of job and life satisfaction [5]. This was the case regardless of whether they had achieved a degree in any of these fields. From these findings, it is clear that the pursuit of personal significance, rather than just satisfying market demand, should serve as the driving principle for educational and career decisions.

Given these results, it is simple to see how a curriculum that places an excessive amount of emphasis on a particular topic may result in graduates who are skilled in their profession but lack ethics or who are superb listeners but have difficulty grasping complicated concepts. Not only does a well-rounded education in the STEM fields have the ability to assist individuals in reaching their full potential, but it also addresses the complex issues that are now confronting modern society. Rethinking education as a place where human values and scientific knowledge complement one another rather than contradicting one another is necessary in order to reach the next level of development.

OBJECTIVES

1. To investigate how the humanities and STEM fields complement one another in promoting comprehensive education and personal growth.
2. To assess how job satisfaction and life outcomes are influenced by interest match rather than just discipline choice.

Method

We collected data from 8,151 working adults with a bachelor's degree or above as part of the Gallup-Purdue Index (GPI) survey that has been running in the US since 1985. On average, there were 58% men, 91% white, and 68% married people who took part. The purpose of this survey was to collect information from college grads about their major. Subsequently, these fields were classified based on whether they belonged to the STEM or humanities fields. The Gallup-Healthways Well-Being Index and economic metrics of academic accomplishment were also incorporated in the results of college [6]. Table 1 displays the findings of the bivariate correlations among the study variables. One of the many issues brought up by the first study is the possibility that the perceived interest fit is affected by the individuals' personalities

and skill sets. We surveyed 636 working adults and new grads from a prestigious Midwest university in order to learn more about this topic. We used the GPI and took into consideration the impact of people's personalities (Big Five) and differing degrees of ability (SAT and GPA). There were 51% men, 88% whites, and 81% unmarried people who took part in the study on average [7]. Bivariate correlations between the study variables are shown in Table 2.

ANALYSIS

Using multiple regression, we were able to adjust for demographic and individual characteristics and investigate how major choice and interest fit impacted each wellbeing outcome. Since this study is concerned with determining the predictive power of a set of independent variables, multiple regression is a suitable statistical tool to employ. Below you will find a report of the unstandardised coefficients (b). These coefficients show how much the dependent variable would change when the independent variable changed by one unit. Several residual plots were examined in an effort to probe the multiple regression assumptions [8]. Normality, homoscedasticity, non-autocorrelation of residuals, and non-multicollinearity of predictors were among these assumptions. For both samples, it was evident from the plots that these assumptions were met. Whether you want to know whether a variable can reliably forecast the outcome, regression analysis is a powerful tool you can utilise. But it doesn't tell you how much of an impact a certain variable has on the result prediction when compared to the other variables in the model. We also conducted a relative weight analysis to find out which elements are the most important for deciding the outcomes of well-being. Using weights that reflect the relative contributions of the variables used to forecast the result, RWA decomposes the anticipated variance in a regression model into weights [9]. Rescaled relative weights (RS-RW) are shown in this section. These weights are a representation of the weights as a percentage of the explainable variance. If the RS-RW is 50%, for instance, it means that the predictor accounts for 50% of the variance in the outcome.

RESULTS

We tested the hypothesis that interest fit may reliably predict outcomes related to well-being beyond the major's content after accounting for demographic factors (Table 1). Personal income was higher ($b = 0.28$, $p < 0.001$) and life satisfaction was somewhat higher ($b = 0.06$, $p < 0.001$) among STEM majors, as shown by the regression analysis. However, all financial and well-being outcomes were positively and significantly predicted by the feeling of interest fit. According to the results, people whose jobs were more aligned with their interests reported higher levels of work satisfaction ($b = 0.62$, $p < 0.001$), life satisfaction ($b = 0.57$, $p < 0.001$), financial satisfaction ($b = 0.04$, $p < 0.001$), and personal income ($b = 0.29$, $p < 0.001$). There was a stronger effect of interest fit on work satisfaction for STEM majors ($b = 0.65$, $p < 0.001$) compared to those in the humanities ($b = 0.58$, $p < 0.001$), and the results showed that the interaction between interest fit and major was the only significant predictor of work satisfaction ($b = 0.04$, $p < 0.001$). The number ten. Both the interaction plot and the areas of significance analysis show that, when perceived fit is strong, there is no difference in the amount of job satisfaction reported by STEM majors and humanities majors. Conversely, when it comes to a poor match, those who study STEM fields are less satisfied with their jobs than those who study the humanities[10]. According to the results of the RWA analysis (Figure 2), 87.0% of the variance in work satisfaction, 50.0% in life fulfilment, 23.0% in financial happiness, and 10% in personal income was explained by the perception of interest fit. Table 1

shows that interest fit, rather than major field, was the most significant predictor of job, life, and personal satisfaction. This is true even though interest fit and major field both explained about the same amount of the variation in personal income[11]. To a lesser extent, these results lend credence to hypotheses 1 and 2. Work satisfaction ($b = 0.53$, $p < 0.001$), life satisfaction ($b = 0.35$, $p < 0.001$), and financial satisfaction ($b = 0.07$, $p < 0.05$) were all significantly predicted by the perception of interest fit, according to the regression analysis results (Table 2). This was true even after accounting for cognitive ability and ability/motivation. On the other hand, it failed to show any meaningful correlation with individual income ($b = 0.05$, $p > 0.05$). But contrary to expectations, the primary field was only a significant predictor of personal income ($b = 0.32$, $p = 0.01$) and had no effect on variables like work satisfaction, life satisfaction, or financial happiness. Research has shown that there is little to no relationship between interest fit and major field.

Table 1. A Predictive Model for Health Outcomes Based on Regression and Relative Weight Analysis [12].

Predictor	Work Satisfaction b / $RS-RW$	Life Satisfaction b / $RS-RW$	Financial Satisfaction b / $RS-RW$	Personal Income b / $RS-RW$
Gender (Female = 1)	0.02 / 0.02 ^a	0.13* / 0.39 ^a	0.04* / 7.97*	-1.03* / 36.17* ^a
Race (White = 1)	0.08* / 0.22 ^a	-0.01 / 0.05 ^a	0.01 / 0.04 ^a	-0.16 / 0.16 ^a
Marital Status (Married = 1)	0.10* / 1.55* ^a	0.60* / 16.93* ^a	0.04* / 5.50 ^a	0.04 / 2.15* ^a
Father Education	0.01 / 0.05 ^a	-0.01 / 0.20 ^a	0.01* / 6.85* ^a	0.01 / 0.09 ^a
Mother Education	-0.001 / 0.03 ^a	0.01 / 0.20 ^a	-0.001 / 2.33 ^a	0.01 / 0.18 ^a
Student Loans ($\sqrt{\quad}$)	0.000* / 0.81* ^a	-0.001* / 4.70* ^a	0.000 / 2.06 ^a	0.000 / 1.68* ^a
Years Since Graduation	0.01* / 2.06* ^a	0.02* / 11.05* ^a	- 0.004* / 14.90*	0.01* / 10.24*
Years Since Graduation (Qu.)	0.000* / 0.58* ^a	0.000* / 1.18* ^a	0.000 / 0.91 ^a	- 0.001* / 14.10*
Years Since Graduation (Cu.)	0.000 / 1.38* ^a	0.000 / 8.55* ^a	0.000 / 5.23* ^a	0.000* / 10.79*
Academic Mentoring	0.01 / 2.33* ^a	0.09* / 3.47* ^a	0.02* / 12.90*	-0.12* / 1.67* ^a
Extracurricular Involvement	0.002 / 0.57* ^a	0.03* / 1.29* ^a	0.02* / 17.87*	0.08* / 1.74* ^a
Major Field (STEM = 1)	0.001 / 0.08 ^a	0.06* / 0.77* ^a	-0.001 / 0.16 ^a	0.28* / 11.10*
Interest Fit	0.62* / 86.93*	0.57* / 50.19*	0.04* / 22.87*	0.29* / 9.54*

Interest Fit × Major Field	0.04* / 3.40* ^a	-0.01 / 1.05* ^a	-0.002 / 0.40 ^a	0.03 / 0.38 ^a
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Table 2. Analysis of Relative Weights and Regression Results for the Prediction of Health Outcomes [13].

Predictor	Work Satisfacti on Model 1 b / RS- RW	Mod el 2 b / RS- RW	Life Satisfacti on Model 1 b / RS- RW	Mode l 2 b / RS- RW	Financia l Satisfacti on Model 1 b / RS- RW	Mode l 2 b / RS- RW	Person al Incom e Model 1 b / RS- RW	Mod el 2 b / RS- RW
Gender (Female = 1)	-0.01 / 0.18 ^a	0.03 / 0.23 ^a	0.19* / 0.83 ^a	0.27 / 2.41 ^a	- 0.19* / 8 .04 *	- 0.12* / 6.13 *	-0.72* / 27.29 ^a	-0.47* / 13.63 ^a
Race (White = 1)	-0.03 / 0.03 ^a	0.07 / 0.23 ^a	-0.16 / 0.86 ^a	0.06 / 0.15 ^a	-0.14* / 1.27 ^a	-0.08 / 0.78 ^a	- 0.21 / 0.5 9	0.13 / 0.16
Marital Status (Married = 1)	0.07 / 0.63 ^a	0.09 / 1.17 ^a	0.55* / 10.66*	0.36 / 4.95 ^a	0.06 / 0.55 ^a	0.09 / 1.77	0.13 / 1.80*	- 0.004 / 0.3 2
Father Education	0.005 / 0.50 ^a	0.002 / 0.51 ^a	-0.02 / 0.35 ^a	0.02 / 1.10 ^a	0.01 / 3.19*	0.03 / 4.96*	0.07* / 2.38*	0.12* / 6.35
Mother Education	0.01 / 0.13 ^a	0.02 / 0.34 ^a	0.05 / 0.75 ^a	-0.01 / 0.18 ^a	0.03* / 3.54*	0.03 / 3.46*	0.03 / 0.71	0.01 / 1.15
S tudent L oans (√)	0.00 / 0.09 ^a	0.00 / 0.06 ^a	-0.002* / 7.31 ^a	-0.002* / 7.43 ^a	-0.002* / 40.24 ^a	-0.002* / 26.95 ^a	0.000 / 0.14	0.001 / 1.59
Years Since Graduation	0.02 / 0.33 ^a	0.09 / 0.52 ^a	0.05 / 0.98 ^a	0.17 / 2.05 ^a	-0.02 / 0.61 ^a	0.05 / 0.30 ^a	0.23* / 6.61 ^a	0.06 / 1.22
Years Graduation (Quadratic)	-0.001 / 0.19 ^a	-0.01 / 0.56 ^a	0.01 / 0.15 ^a	-0.11 / 1.14 ^a	0.01 / 0.57 ^a	0.02 / 0.41 ^a	- 0.04 / 0.18	- 0.23* / 1.7 7

Years Graduation (Cubic)	-0.01 / 0.67 ^a	-0.02 / 0.77 ^a	-0.001 / 0.49 ^a	-0.06 / 1.44 ^a	0.000 / 0.56 ^a	-0.003 / 0.54 ^a	- 0.02 / 2.97 [*]	- 0.07 [*] / 1.33
Academic Mentoring	-0.04 / 0.98 ^a	-0.04 / 1.87 ^a	-0.001 / 4.47 ^a	0.01 / 4.10 ^a	-0.04 / 1.25 ^a	-0.02 / 1.06 ^a	- 0.28 [*] / 4.23 [*]	- 0.27 [*] / 2.92
Extracurricular Involvement	0.01 / 0.91 ^a	0.01 / 0.86 ^a	0.03 / 2.64 ^a	0.03 / 2.34 ^a	0.03 [*] / 3.16 [*]	0.001 / 1.15	0.06 / 1.90 [*]	0.07 / 3.28
Social Support in College	0.15 [*] / 3.40 ^a	0.25 [*] / 5.60 ^a	0.39 [*] / 11.55 [*]	0.36 [*] / 9.13 [*]	0.16 [*] / 6.39 [*]	0.17 [*] / 5.24 [*]	0.32 [*] / 2.95 [*]	0.34 [*] / 2.79
Extroversion	0.02 / 0.96 ^a	0.04 / 0.89 ^a	0.10 [*] / 3.45 ^a	0.19 [*] / 6.48 ^a	0.01 / 0.19 ^a	0.02 / 0.26 ^a	0.07 / 0.87	0.07 / 0.76
Agreeableness	-0.03 / 1.04 ^a	-0.02 / 0.66 ^a	-0.06 / 1.97 ^a	-0.05 / 1.58 ^a	0.04 / 0.66 ^a	0.04 / 0.87 ^a	0.23 [*] / 8.07 ^a	0.18 [*] / 5.14
Conscientiousness	0.07 [*] / 3.00 ^a	0.07 / 3.30 ^a	0.22 [*] / 6.98 ^a	0.33 [*] / 11.43 ^a	0.04 / 0.99 ^a	0.04 / 0.60 ^a	0.12 [*] / 0.97	0.06 / 0.52
Neuroticism	-0.10 [*] / 4.50 ^a	-0.14 [*] / 5.92 ^a	-0.24 [*] / 8.80 ^a	-0.10 / 3.16 ^a	- 0.13 [*] / 10.49 [*]	- 0.12 [*] / 9.02 [*]	-0.17 [*] / 7.88 ^a	- 0.15 / 6.55
Openness	-0.05 / 0.13 ^a	-0.13 [*] / 0.93 ^a	-0.03 / 0.23 ^a	-0.04 / 0.26 ^a	-0.06 [*] / 1.58 ^a	- 0.07 / 2.93 [*]	0.08 / 0.39	0.09 / 0.44
SAT Math	— / —	0.001 / 0.55 ^a	— / —	0.004 [*] / 19.19 ^a	— / —	— / —	— / —	— / —
SAT Verbal	— / —	-0.001 / 0.37 ^a	— / —	- 0.002 / 2.17	— / —	— / —	— / —	— / —
Collegiate GPA	-0.12 / 0.38 ^a	-0.06 / 0.93 ^a	-0.04 / 0.89 ^a	0.11 / 1.36	— / —	— / —	— / —	— / —

Work in Major	-0.07* / 2.26 ^a	-0.06 / 3.97 ^a	0.14* / 5.29 ^a	0.04 / 3.52 ^a	0.08* / 4.17*	0.04 / 3.09*	0.32* / 10.79 ^a	0.28* / 9.47*
Major Field (STEM = 1)	0.01 / 0.68 ^a	-0.03 / 0.41 ^a	0.17* / 2.85 ^a	0.15 / 1.83 ^a	0.10* / 4.91*	0.04 / 2.65*	0.41* / 17.19 ^a	0.32* / 14.81 ^a
Interest Fit	0.52* / 64.57*	0.53* / 54.68*	0.27* / 20.38*	0.35* / 24.55*	0.08* / 6.27*	0.07* / 5.82*	0.003 / 1.50 ^a	0.05 / 2.62
Interest Fit × Major Field	-0.03 / 14.80 ^a	0.001 / 14.14 ^a	0.09 / 9.01 ^a	0.07 / 8.91*	-0.001 / 1.37 ^a	-0.002 / 1.46 ^a	0.05 / 0.59	-0.005 / 0.44

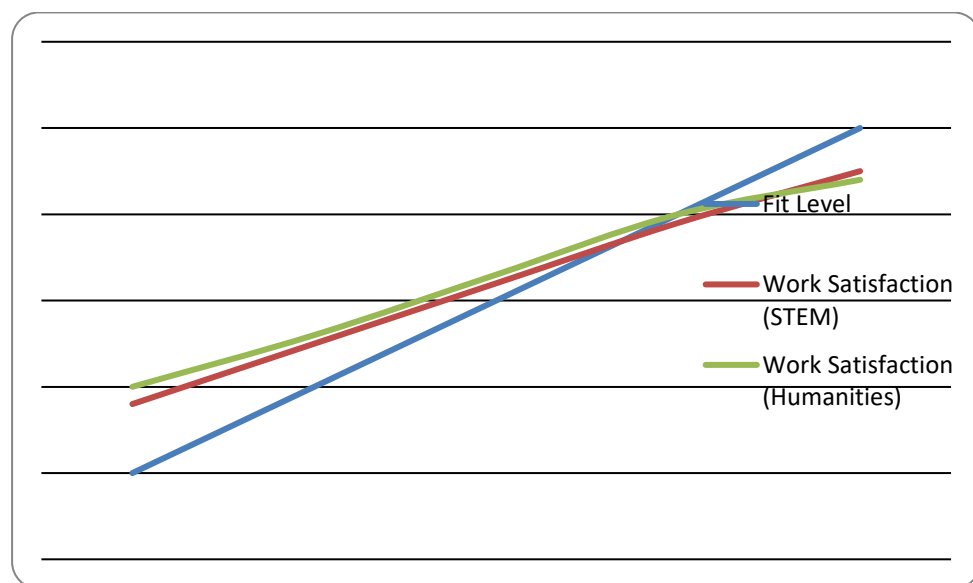


Figure 1. Interaction between Interest fit and major field in predicting work satisfaction[14].

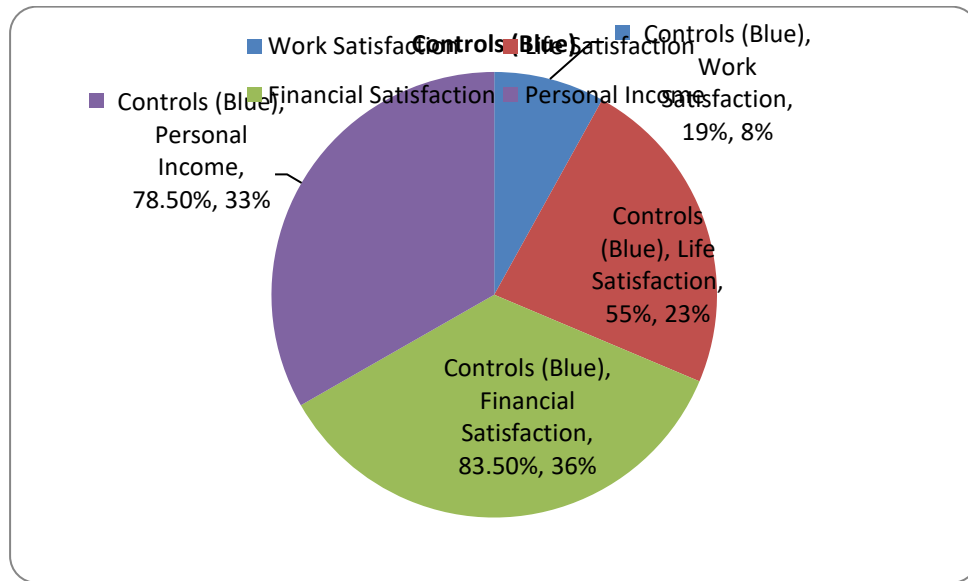


Figure 2. Percentage of explained variance accounted for by predictors[15].

The RWA analysis found that interest fit explains 55% of the variance in work satisfaction, 24.6 % of the variance in life fulfilment, 3.3 % of financial contentment, and 3% of personal income. Although there was some variation in work and life satisfaction due to the major field, a far higher amount of variation was accounted for by interest fit. Also, whereas interest fit accounted for 3% of the variance in personal income and major for 15%, the two variables were statistically indistinguishable when it came to predicting financial satisfaction (6% vs. 3%). Although the evidence is limited, these results provide some credence to hypotheses 1 and 2.

DISCUSSION

The study results illuminate the complex relationships between interest fit, major area (especially STEM vs. the humanities), and several well-being outcomes. These outcomes include, but are not limited to, personal income, financial contentment, job satisfaction, life happiness, and financial fulfilment. Both regression models found that the perceived interest fit had the greatest impact on all well-being-related outcomes (Table 2 and Table 1)[16]. Work ($b = 0.62$; $b = 0.53$), life ($b = 0.57$; $b = 0.35$), financial ($b = 0.04$; $b = 0.07$), and personal income ($b = 0.29$) satisfaction levels were substantially higher among individuals who reported a stronger alignment between their interests and their work, according to the data shown in Table 1. However, when ability and motivation were included, Table 2 showed that this influence was not significant ($b = 0.05$). Data like these show that interest fit has positive psychological and economic ramifications, on top of its typically disproportionately strong effect over demographic and cognitive features.

Both tables and Figure 2 demonstrate that interest fit was the most significant factor in explaining the diversity in outcomes such as work satisfaction (up to 87 percent), life happiness (50 percent), and financial satisfaction (23 percent). The evidence presented here demonstrates that having a sense of purpose in one's job is not only beneficial to one's mental and financial well-being, but it is absolutely necessary[17]. The correlation between major field (STEM vs humanities) and personal income was shown to be statistically significant in both Table 2 ($b = 0.32$) and Table 1 ($b = 0.28$).

However, the correlation was not as strong in predicting subjective well-being outcomes such as job or life satisfaction. Additionally, it is important to note that graduates with degrees in STEM disciplines reported higher income levels, which lends validity to the economic advantages that are often associated with technology professions. However, there was a catch: this was only true for those who were satisfied with their jobs[18]. It would seem that those working in STEM fields are less content with their careers when they do not have the perception that they are contributing to something that is of genuine interest to them, in contrast to those working in social sciences and humanities. The differences between the two sets of data, on the other hand, disappear when the fit is high, as can be seen in Figure 1 of the interaction plot[19].

Furthermore, when ability and motivation-related criteria such as grade point average, SAT scores, and personality traits were included in the analysis, interest fit continued to retain its strong explanatory power, especially with regard to work and life satisfaction (Table 2). On the other hand, the influence of major fields dropped, which is further confirmation that, for the bulk of well-being indicators, personal alignment is more essential than field choice alone[20]. A number of affects were also seen with regard to background and demographic parameters, such as gender, marital status, educational level, and student debt. One example is that there was a little but statistically significant negative link between gender and income. Additionally, taking out student loans had a slight but noteworthy impact on the level of enjoyment that one had in terms of their financial situation[21]. On the other hand, in comparison to interest fit and major, these factors accounted for a much less percent of the total variance. When all of the data are taken into consideration, they provide only a limited amount of evidence for two hypotheses: (a) that suitability of interests is a predictor of well-being, and (b) that suitability of interests moderates the connection between major and well-being[22]. However, when it comes to financial happiness and income, where elements such as economic structure and academic discipline have a bigger influence, the evidence is less than it is when it comes to work satisfaction. This is because the evidence is stronger when it comes to job satisfaction.

CONCLUSION

Conversations between the STEM fields and the humanities should be seen as a call to collaborate rather than a confrontation. When students get a balanced education in the arts, humanities, STEM fields, and mathematics, they are better equipped to tackle the complex problems of both the present and the future. The ability to think critically, empathically, and effectively is essential for understanding society and human values; the STEM fields educate students to think creatively and analytically, but the arts and social sciences teach these skills as well. Along with their scientific and technical acumen, this supplementary effort produced a new crop of leaders who are more equipped to affect global change via empathy, introspection, and cultural awareness. By giving each sector the same amount of focus, we can increase collaboration, creativity, and responsible leadership while also closing the gap between innovative and ethically executed ideas. In a world when climate change, social injustice, and the ethics of artificial intelligence are all pressing issues, this all-encompassing educational paradigm will guarantee that our development is efficient, equitable, inclusive, and sustainable. A future that is both technologically sophisticated and empathetic may be within reach if schools integrate STEM and the humanities curricula. This frees up the following generation to take the lead with wisdom and candour.

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