Reimagining Education: Online Learning's Potential to Mitigate the Global Learning Crisis

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List of Abbreviations

CVT — Control-Value Theory

HDI — Human Development Index

HCI — Human Capital Index

HLO — Harmonized Learning Outcome

OECD — Organisation for Economic Co-operation and Development

PIRLS — The Progress in International Reading Literacy Study

PISA — The Programme for International Student Assessment

RISE — Research on Improving Systems of Education

SDG — Sustainable Developmental Goals

TIMSS — The Trends in International Mathematics and Science Study

UIS — UNESCO Institute for Statistics

UN — United Nations

U.S. — United States

USD — United States dollar

WHO — World Health Organization

Abstract

This research report explores the role of online education in mitigating the global learning crisis by enhancing student engagement and reducing boredom. Despite increased enrollment rates, many students worldwide lack essential literacy and numeracy skills, indicating a disparity between education access and quality. The report explores the control-value theory of emotions, demonstrating how emotions like boredom and enjoyment impact learning outcomes. It emphasizes the potential of online learning platforms, such as those provided by CourseClout, to provide adaptive, high-quality educational experiences that cater to individual learning needs and strengthen disadvantaged school systems. By leveraging technology, online learning can address the limitations of traditional education systems, particularly in low- and middle-income countries with high student-to-teacher ratios and inadequate teacher training.

Keywords: CourseClout, Global Learning Crisis, Engagement, Boredom, Control-Value Theory (CVT).

Executive Summary

Overview

This report examines the role of online education in mitigating the global learning crisis by enhancing student engagement and reducing boredom. Despite increased enrollment rates, many students worldwide lack essential literacy and numeracy skills, indicating a disparity between education access and quality. The report explores the control-value theory of emotions, demonstrating how emotions like boredom and enjoyment impact learning outcomes. It emphasizes the potential of online learning platforms, such as those provided by CourseClout, to offer adaptive, high-quality educational experiences that cater to individual learning needs and strengthen disadvantaged school systems.

Key Findings

Global Learning Crisis:

- Over 387 million primary school children lack basic math and reading proficiency.
- Before the pandemic, 53% of children in low- and middle-income countries could not read and understand a simple text by age 10, with 90% affected in low-income countries.
- The COVID-19 pandemic has exacerbated the learning crisis, potentially increasing learning poverty to 70% in low- and middle-income countries.
- Pandemic-related school closures could cost the affected generation of students 10 trillion USD in lifetime earnings.

Traditional Education's Contribution:

- Traditional classrooms often fail to meet students' control and value appraisals, leading to negative emotions that hinder learning.
- High teacher-to-student ratios and inadequate teacher training exacerbate student disengagement and boredom.
- Traditional passive learning strategies reduce student autonomy and enjoyment, impacting learning outcomes negatively.
- Boredom in class significantly impacts academic outcomes, diverting attention from classroom tasks and diminishing motivation.

Control-Value Theory (CVT)

- CVT posits that emotions during learning come from a student's assessment of tasks and influence learning outcomes.
- Positive emotions like enjoyment arise from high control and value appraisals, enhancing focus and cognitive flexibility.
- Negative emotions like boredom and anxiety result from low control and value appraisals, reducing cognitive resources and motivation.
- **Some interesting findings about boredom and enjoyment:**
    - **Tze et al. (2016)** found that boredom has the most substantial negative relationship with academic motivation (r = -.40), study strategies and behaviors (r = -.35), and achievement (r = -.16). This meta-analysis consisted of 29 studies published between 1990 and 2014, encompassing 19,052 secondary school and university students.
    - **Camacho-Morles et al. (2021)** found that boredom negatively impacts academic performance (ρ = −.25), while enjoyment positively affects academic performance (ρ = .27). The authors reviewed 68 studies from 1986 to 2019 involving 28,410 participants to understand the role of emotions in academic performance.
    - **Pekrun et al. (2002)** established that enjoyment correlates with higher intrinsic and extrinsic motivation, increased effort, and students' use of flexible learning strategies. This study by Pekrun and colleagues was quite elaborate, using several cross-sectional, longitudinal, and diary studies to study college and school students and investigate how achievement emotions influence learning outcomes.

The Potential of Online Learning

- Online learning platforms can track learner progress and help teachers identify students who need extra help.
- Adaptive learning systems, leveraging artificial intelligence, can tailor the speed and content of lessons to each student’s needs. In this way, those behind, whether or not as a result of the pandemic, can catch up and realize their potential within the education system.
- In countries with substandard teacher skills, online learning platforms show promise as a low-cost solution.
- Companies like CourseClout offer personalized, adaptive learning experiences, increasing control and value appraisals and fostering positive emotions like enjoyment.

CourseClout's Role

- CourseClout provides comprehensive online course creation services, including curriculum design, production, and LMS implementation.
- Their adaptive learning management systems help track student progress and personalize learning experiences.
- Although not covered in this report, CourseClout's high-quality video content and AI-generated visuals improve engagement and learning outcomes. Subsequent reviews or primary research could explore the impact of CourseClout's services on students' boredom, enjoyment, engagement, and learning.

Conclusion

To tackle the global learning crisis, we need to improve the quality of education and make it more relevant and engaging. Online learning offers a promising solution, supported by companies such as CourseClout. By reducing boredom, increasing engagement, and providing high-quality educational experiences, online learning can play a crucial role in complementing policies addressing the learning crisis. This approach can accelerate progress towards Sustainable Development Goal 4 by ensuring quality education for all.

About the Author

Jacob J. P. Le Grange is a graduate of the esteemed KU Leuven. He currently serves as a research consultant for CourseClout. Jacob has published work on education and psychology in international journals and is keenly interested in using statistical simulations to inform psychological research and methodology. He resides in Brussels, Belgium.

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Reimagining Education: Online Learning's Potential to Mitigate the Global Learning Crisis

"Inclusive, good-quality education is a foundation for dynamic and equitable societies"

— **Desmond Tutu (South African Anglican bishop and human rights activist)**

"Education is essential to change, for education creates both new wants and the ability to satisfy them." — **Henry Steele Commager (American historian, educator, and civil libertarian)**

1. Introduction

The Sustainable Development Goals (SDGs) are 17 goals established by the United Nations (UN) to provide a framework for member states to achieve a better and more sustainable future for everyone (United Nations, 2016). SDG 4 focuses on education, and the UN broadly defines the goals as ensuring "...inclusive and equitable quality education and promoting lifelong learning opportunities for all" (United Nations, 2016, p. 4). If the leading indicators of progress towards SDG 4 use school enrollment numbers as a proxy (c.f., Langthaler & Malik, 2023; Unterhalter, 2019), then global education is making significant strides.

Most of the literature concurs that education has experienced a significant expansion globally (Angrist, 2022; Angrist et al., 2021; Bold et al., 2017; Goujon, 2022; Hanushek & Woessmann, 2015; Leone, 2019; UNICEF, 2022a, 2022b; World Bank, 2018). The global average years of schooling completed by adults has more than doubled, rising from 3.2 years in 1950 to 7.6 years in 2010 (Angrist, 2022). Furthermore, the global percentage of individuals aged 15 years and older lacking formal education decreased from 46% to 12% between 1950 and 2020 (Goujon, 2022). Sub-Saharan Africa, the Middle East, and North Africa are the regions with the most significant growth in terms of education (Leone, 2019). This growth is great news for Sub-Saharan Africa, as its education systems and learning levels/progress are considered inadequate compared to other world regions (e.g., Angrist et al., 2021; Azevedo et al., 2019). For example, in Sub-Saharan Africa, children born between 1940 and 1945 had an average education of 2.4 years (Leone, 2019). In contrast, those born in 1980 had an average of 6.4 years. This increase represents a 170% increase in average education in this region throughout these 35 to 40 years (Leone, 2019). This brief overview demonstrates that global education appears to be making strides toward providing quality education opportunities for all.

The global figures for net primary school[1] attendance[2] reveal a highly optimistic trend. Globally, the adjusted net attendance rate reached 87% in 2021 (UNICEF, 2022a), an increase from 72.31% in 1970 (UNESCO Institute for Statistics, 2022). UNICEF (2022a) reports a 35% decrease in primary school-age children not attending school over the past 20 years, indicating significant progress in increasing global primary school attendance. The narrowing gaps in primary school enrollment

1 Primary school education generally caters to children aged 6 to 11, although there are variations between countries(UNICEF, 2022a).

2 The net attendance rate refers to the proportion of primary-aged children enrolled in primary school(UNICEF, 2022a).

between high- and low-income countries also reflect this progress (World Bank, 2018). Zooming in on Sub-Saharan Africa, primary school enrollment rates increased from 40% in 1970 to almost 80% in 2014 (Bold et al., 2017).

This promising trend applies not only to enrollment but also to the reduction in the number of students who do not finish primary school. Significant global progress is evident, with the percentage of students not completing primary school decreasing from 12% in 1950 to 6% in 2020 (Goujon, 2022). Similarly, UNICEF reports that four out of five children complete primary school education (2022a). The percentage of children not enrolled in primary and secondary education[3] decreased from 26% in 2000 to 19% in 2010 and further to 17% by 2018 (United Nations, 2020). These improvements underscore the ongoing efforts and achievements in enhancing global educational access and retention.

By 2030, SDG 4 aspires to guarantee that every youth finishes secondary education and, in the process, acquires meaningful learning experiences (Azevedo et al., 2019)**.** From the vantage point of enrollment progress, this seems plausible if one equates secondary school enrollment and completion with meaningful learning[4]. The global net enrollment rate for secondary schools increased by over 10% in 18 years, rising from 54.94% in 2000 to 66.27% in 2018 (Statista, 2021). The attendance of children eligible to attend lower secondary school is 65%, while the number of these children who are not attending lower secondary school reduced from 98 million in 2000 to 63 million in 2020 (UNICEF, 2022b). A comparable decline was observed in out-of-school upper secondary-aged children, falling from 175 million in 2000 to 132 million in 2020. Estimates show that in 2021, the net attendance rates for upper secondary education were 52% (UNICEF, 2022b).

These promising gains in secondary education enrollment set a solid foundation for the remarkable surge in higher education enrollments worldwide, hinting at a new era of global education expansion. Between 1940 and 1989, the percentage of people with a university degree more than doubled, increasing from 14.7% to 30.2% (Leone, 2019). Moreover, global university enrollment has significantly risen, more than doubled from 2000 to 2014 (Unesco, 2017, as cited in Langthaler & Malik, 2023). These trends are encouraging regarding the progress made in children's learning. I state this because, in 2020, children with university-educated parents showed less impact from the COVID-19 pandemic on their learning progress (UNESCO et al., 2021). Despite these positive global education trends, some evidence indicates they might not entirely reflect the current state of worldwide

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3 According to UNICEF (2022b), secondary education (usually ages 12-17) varies by country but generally includes lower secondary education (ages 12-15, 3-4 years) and upper secondary education (ages 15-17, 2-3 years).

4 I will revisit this topic shortly

education. In the following section, I will briefly outline some of this evidence, referencing the connection between human capital and education.

1.1. Global Education Progress Might Not Be as Rosy as It Seems: Do Enrollment Increases Reflect Real Progress?

Human capital refers to an individual's knowledge, skills, abilities, and traits contributing to their personal, social, and economic well-being (Altiner & Toktas, 2017). According to Altiner and Toktas (2017), human capital is often linked to education because it transforms society and improves living standards. This linkage clarifies why human capital theory emphasizes that education is an investment in human capital (Tran, 2020). Additionally, regardless of a country's abundance of physical, financial, and natural resources, a skilled workforce is necessary to use these resources effectively for sustainable economic growth (Altiner & Toktas, 2017). The influential work of Schultz (1961) and Becker (1964) showed that investment in education and training, which they consider inextricably linked to human capital, enhances individual productivity, leading to economic growth and development.

Moreover, these investments in human capital are crucial for personal career growth and the economic advantages they bring to society (Becker, 1964; Schultz, 1961). Even the leading measure of human capital, the United Nations' Human Development Index (HDI), firmly links human capital to education by using years of schooling as the proxy for human capital (Angrist, 2022; Angrist et al., 2021). Intriguingly, this is where research about global education and learning takes a fascinating turn.

Hanushek and Woessmann (2012) used data from 50 countries between 1964 and 2003 to investigate how cognitive skills and school attainment relate to economic growth. They measured cognitive skills using direct maths and science skills measures in their growth analysis. The significant and practical effect of cognitive skills on a country's long-term economic growth rate was one robust finding of this study. Furthermore, the consistency of this relationship was evident across different samples, cognitive skills tests, and models, which Hanushek and Woessmann (2012) note is uncommon in their field. *Surprisingly*, the study showed that school attainment levels are not statistically significant for economic growth, even when cognitive skills are directly measured. These findings suggest that literacy and numeracy are more vital than education attainment for economic progress, challenging the assumption that increasing education enrollment or completion rates boost a country's economy.

This counterintuitive finding is seen worldwide in both developed and developing countries. It seems that global expansion in education did not affect any expected improvements in economic and

social well-being (Hanushek & Woessmann, 2008, 2015). The global average Human Capital Index (HCI) score in 2019 was 0.56 (Azevedo et al., 2019). This means a child born today will achieve just 56% of their potential productivity by age 18, compared to the ideal scenario of complete education and health. The Organisation for Economic Co-operation and Development (OECD) comprises 38 high-income, developed countries. These nations collaborate on economic growth, global trade, and policy-making. Most member countries have robust education systems, yet, on average, about one in four 15-year-olds in OECD countries do not reach a basic level of proficiency in reading or math (OECD, 2019). Even in North America, school enrollment has been high for years, yet student scores on reading, math, and science tests showed little change between 2000 and 2015 (Angrist, 2022). Improved education access in developing countries has yet to result in economic progress, as they still trail behind developed countries in economic prosperity (Hanushek & Woessmann, 2008).

1.2. Global Education Crisis

It is now well established that the global education crisis significantly contributes to these disparities between increased education enrollment, skills, and human capital. The global learning crisis refers to the phenomenon where, despite increased school enrollments, many students worldwide lack basic literacy and numeracy skills (Azevedo et al., 2019; Bold et al., 2017; Bryant et al., 2022; UNESCO et al., 2021; UNESCO Institute for Statistics, 2017, 2020; World Bank, 2018). The global education crisis explains this by illustrating that the number of years spent in school is unreliable because the quality of education, not the duration, significantly enhances human capital and individual productivity and drives economic progress. For example, cognitive skills, such as math and science literacy, account for a large extent of the variation of economic progress across countries (Hanushek & Woessman, 2008). According to Hanushek and Woessman (2008), up to 73% of the differences in economic growth across countries from 1960 to 2000 can be explained by average international test scores and starting GDP per capita. While their study focuses on numeracy and science skills, the World Bank (2018) uses *learning poverty,* the inability to read and understand a simple text by age 10, as a foundational proxy for the global learning crisis. This indicator combines schooling and learning indicators by starting with children who still need to achieve minimum reading proficiency, adjusted by the proportion of children out of school who are assumed to be unable to read proficiently (Azevedo et al., 2019). The report addresses the extent of learning poverty later in the report. The essential ability to read and understand text plays a central role in the education-learning gap, where merely sitting in school does not translate to learning.

Reading proficiency at the foundational level is vital to succeeding in school and employment. While the reasons are obvious, The World Bank's reports (e.g., Azevedo et al., 2019; World Bank, 2018) provide compelling arguments for this. When children do not learn to read by the end of grade 2, it becomes difficult to catch up because learning is cumulative (World Bank, 2018). By grade 3, children are expected to use the knowledge gained from reading and applying it to other subjects (World Bank, 2018). It is, therefore, no surprise why Azevedo et al. (2019) equates sufficient reading at this foundational age as a "gateway to learning" as it allows children to learn other subjects like math, science, and humanities. Moreover, foundational reading ability comes at a critical period, which, if missed, may impede a child's future learning and skills in society.

Children who fail to develop basic reading skills early on will likely fall behind their peers and may never catch up (Ra et al., 2021; World Bank, 2018). It is no wonder that among U.S. High School dropouts, 45% start high school feeling unprepared (Bridgeland et al., 2006). It is also quite likely that the lack of foundation reading ability and subsequent failure to master the necessary skills in other subjects explain why 35% drop out because they fail at school (Bridgeland et al., 2006). However, despite a concern that the lack of skills may fuel the already concerning number of children out of school, 258 million before the pandemic (UNESCO et al., 2021), the lack of basic reading skills affects those who stay in and finish school. In the modern world, even basic tasks need some reading comprehension. Without this crucial skill, people may struggle in many areas of life, such as work, making financial choices, and participating in civic activities (Azevedo, 2019). These effects, of course, not only concern the individual’s learning trajectory but also their economic outlook and that of their country.

The global learning crisis has hampered economic growth and diminished productivity (Azevedo et al., 2019; Bryant et al., 2022). Before the pandemic, the learning crisis did not alleviate social and economic disparities between low- and medium-income countries as opposed to high-income countries. Instead, it exacerbated them (see World Bank, 2018). As early as 2014, a UNESCO report estimated that the global learning crisis costs governments about 129 U.S. dollars (USD) per year (Global Education Monitoring Report Team, 2014). Earlier reports estimate Potential economic losses due to unaddressed learning gaps are staggering; one estimate projects annual losses of 1.6 trillion USD to the global economy by 2040 (Bryant et al., 2022).

Moreover, early estimates suggest that pandemic-related school closures and their effect on exacerbating the learning crisis could cost the affected generation of students 10 trillion USD in lifetime earnings (UNESCO et al., 2021). In a more pessimistic scenario, *this could rise to 16 trillion*

USD(UNESCO et al., 2021). Under this scenario, a typical student might lose $25,000 in lifetime earnings in present value terms (UNESCO et al., 2021). The global learning crisis, compounded by the pandemic, presents a dire economic threat, underscoring the urgent need for comprehensive educational reforms to mitigate learning and long-term financial losses.

Where does one start in addressing this crisis? The global learning crisis is the result of several causes, which I will address in the literature review of this report. Given the focus of this report on the learning environment, we give special attention to a World Bank (2018) report that proposes using scientific evidence in creating effective learning environments. The thesis of this report is that there is scientific evidence that online learning can effectively address the global learning crisis and increase learning. Therefore, the report's objectives and scope are designed with this in mind.

2. Aims and Scope of The Report

2.1. Aims

This report examines how online learning can address the global learning crisis. It demonstrates how CourseClout's services contribute to this goal by reducing learner boredom, increasing engagement, improving teaching quality, and mitigating learning losses.

CourseClout is a company that provides comprehensive online course creation services for course creators, SMBs, government education initiatives, academies, and enterprises. They offer end-to-end solutions to create engaging, high-quality courses, including curriculum design, production, and LMS implementation. Their goal is to transform online learning by reducing dropouts and enhancing learner engagement, ultimately helping clients productize knowledge and deliver effective educational content that leads to better learning outcomes.

2.2. Scope of The Report

While the causes and solutions to the global learning crisis are numerous, this report focuses on the learning environment. I examined teaching quality, boredom, enjoyment, engagement, and curriculum design to demonstrate the role of online and blended learning[5] environments in addressing the global education crisis. These constructs are relevant in both face-to-face and online lectures, as well as during homework, assignments, studying, and exams (c.f., Butz et al., 2015; Loderer et al., 2020; Pekrun et al., 2007; Pekrun & Goetz, 2023).

When discussing traditional education, this report focuses exclusively on face-to-face classroom activities. In online learning, interactive elements like quizzes, videos, and assignments within ongoing video lectures make comparing enjoyment, engagement, or boredom with face-to-face settings challenging. Consequently, the report will concentrate on face-to-face and virtual classroom activities rather than addressing enjoyment, boredom, or engagement during individual homework, study, or test sessions.

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5 Blended learning combines face-to-face and technology-mediated instruction, leveraging the strengths of both environments (Romero & Ventura, 2020). It is often used interchangeably with "hybrid learning" and "mixed-mode instruction" (Romero & Ventura, 2020). Blended learning is typically defined by its combination of online and in-person components rather than characteristic teaching methods (for more detailed explanations, see: Delialioğlu, 2012; Graham et al., 2014; Halverson & Graham, 2019).

While the global education crisis primarily concerns primary and secondary school children, the report focuses on lifelong learning, as encapsulated by SDG 4. Boredom, enjoyment, and engagement and their impact on effective learning are universal, extending beyond school, university, or informal learning contexts. **I, therefore, deem the report's review, findings, and conclusions relevant for all forms of learning, whether informal (e.g., extracurricular courses) or formal (e.g., school, university, employee training).**

2.3. Process of Literature Review

The literature for this report includes institutional reports, review articles, chapters in academic books, and data from institutional databases. The primary sources were academic databases such as ERIC and Web of Science, with Google Scholar occasionally used as a last resort. I also used secondary sources cited in the primary sources to expand the pool of relevant research. Additionally, Research Rabbit, an AI-powered tool, was employed to discover new academic research based on the existing pool of sources.

3. Global Learning Crisis

The extent, causes, and possible solutions to the learning crisis are still a hot topic worldwide. The staggering number of reports highlighting the global learning crisis has not dwindled. Its importance has been highlighted in reports by prominent international organizations, including the World Bank (e.g., Chanduvi et al., 2022; World Bank, 2018), UNESCO (e.g., Global Education Monitoring Report Team, 2014; UNESCO, 2023), UNICEF (Chanduvi et al., 2022; UNICEF, 2020, 2022a, 2022a), OECD (e.g., Hanushek & Woessmann, 2015), and the UN (United Nations, 2016, 2020), and joint reports by these organizations (i.e., UNICED, UNESCO, and World Bank: UNESCO et al., 2021)**.** Its prominence is featured in reports by research companies (e.g., McKinsey & Company: Bryant et al., 2022)**,** research programs (e.g., such as Research on Improving Systems of Education [RISE]: Crouch, 2020), and research institutes (e.g., Austrian Foundation for Development Research [ÖFSE]: Langthaler & Malik, 2023). *As highlighted by some of these reports, the pandemic only exacerbated the global education crisis and its sequelae* (Bryant et al., 2022; Chanduvi et al., 2022; Kaffenberger, 2021; Lutz et al., 2021; UNESCO et al., 2021). Below, the report highlights the extent of the crisis, including significant pre and post-pandemic estimates and projections.

Over 387 million primary school children (6 to 11 years old) lack basic maths and reading proficiency (UNESCO Institute for Statistics [UIS], 2017). Before the pandemic, the data estimated that about 53% of all children in low- and middle-income countries could not read and understand a simple sentence by age 10 (Azevedo et al., 2019; World Bank, 2018). *Therefore, more than half of the world's primary school-aged children are experiencing learning poverty* (see this section above). However, Azevedo et al. (2019) caution that this average conceals significant variation among low-, middle-, and high-income countries. The 53% average is held down by lower levels of learning poverty in upper-middle-income countries. For instance, countries with upper-middle-income have a learning poverty rate of 29%, whereas lower-middle-income countries have a rate of 55% (Azevedo et al., 2019). In low-income countries, 90% of children are affected (Azevedo et al., 2019). These estimates pertain only to a 10-year-old's proficiency to understand and read a basic text. Given the report's introduction (c.f., this section), it is logical to deduce that these deficiencies in reading abilities can result in an inability to master skills in other subjects, such as mathematics and science. However, is this genuinely the situation?

The answer seems affirmative since UIS data estimate that in 2015, over 387 million primary school children (6 to 11 years old) lacked basic maths and reading proficiency, and this figure is

estimated to be 230 million for adolescent pupils (12-14 years old: 2017). Globally, 61% of adolescents cannot achieve the minimum levels of numeracy and maths while completing lower secondary school (UIS, 2017). **This means that about 6 out of 10 children globally lack the basic numeracy expected of them.**

These estimates elucidate why the global learning crisis and learning poverty are usually discussed regarding disparities between developed and developing nations. UIS data shows a significant gap in learning poverty rates based on income (2017). For example, in 2015, 91% of primary school-age children in low-income countries were not expected to reach basic proficiency in reading and 87% in math, compared to only 5% and 8% in high-income countries. The gap remains at the lower secondary level, with 90% (45 million) in low-income countries versus 26% (11 million) in high-income countries. Clearly, the learning crisis is a phenomenon that disproportionately affects low- and middle-income countries as opposed to high-income countries. However, as noted in the introduction, high-income countries are not immune to the education-skills gap, and, as will be evident later, these developed education systems also experienced learning losses due to the COVID-19 pandemic. **While these data give a good indication of the global learning crisis, it might be helpful to examine a study that synthesized various global indicators of learning.**

In a 2021 study, Angrist and colleagues set out to investigate the extent of the global education crisis by constructing an enormous database containing data from seven international learning indicators, including PISA, TIMSS, and PIRLS.[6] The Harmonized Learning Outcome (HLO) database encompasses globally comparable learning outcomes for 164 countries from 2000 to 2017, covering 98% of the world's population. By comparing trends in schooling (measured by adjusted enrollment ratios) and learning (measured by HLO scores) from 2000 to 2015, the authors found that while schooling increased, learning progress remained limited. Angrist et al. (2021) developed HLO scores based on TIMSS scores, where 625 represents high performance, and 300 represents low performance in science and math. HLO scores are, therefore, a proxy of children's science and mathematic skills. This characteristic education-skill gap of the global learning crisis was observed across different regions. Enrollment rates in the Middle East and North Africa increased to an impressive 99% by 2010, up from 95% in 2000. However, despite this progress, learning levels in these regions remained

6 I included the abbreviations in the main text for stylistic purposes: PISA = The Programme for International Student Assessment; TIMSS = The Trends in International Mathematics and Science Study; and PIRLS = The Progress in International Reading Literacy Study.

consistently low, with a baseline score of around 380 from 2000 to 2015. Even countries with high and relatively stable enrollment rates, like Latin America and the Caribbean, show slow learning progress. Moreover, while high-income countries significantly outperformed middle- and lower-income countries in terms of skills in mathematics and science, regions such as North America and Europe show a plateau in HLO score over time. This trend of slow learning progress seems to be present regardless of whether or not baseline learning levels were low. For example, regions such as North America had high baseline learning levels, according to Angrist et al.'s (2021) analysis. In contrast, Latin America and the Caribbean had low levels of initial baseline learning. Despite this, both regions show decreased learning improvement, thereby making it very difficult for countries in these regions to increase the level of learning in instances where learning does not occur.

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic(World Health Organization [WHO], 2020). This declaration followed the first cases reported in Wuhan, China, in December 2019 and the declaration of a Public Health Emergency of International Concern on January 30, 2020(WHO, 2020). During the peak of the COVID-19 pandemic, around 1.6 billion children in 188 countries experienced school closures (UNESCO et al., 2021). Before COVID-19, the World Bank had already sounded the alarm bells on the slow progress of reducing learning poverty. They estimated that by the standards of pre-COVID progress, learning poverty would be at a rate of 43% in low- and middle-income countries by 2030 (Azevedo et al., 2019; World Bank, 2018). Alarmingly, simulations project an increase from 56 to 70% in learning poverty due to the pandemic (UNESCO et al., 2021). It is now well-accepted that the COVID-19 pandemic significantly exacerbated the global learning crisis (Angrist, 2022; Angrist et al., 2021; Bryant et al., 2022; UNESCO et al., 2021). **To explore this, the reader should suspend, albeit for a moment, that it is not the number of schooling years but the quality of schooling that affects learning (Angrist et al., 2021; Lutz et al., 2021).**

In a compelling report, McKinsey & Company estimated the learning loss experienced by students during the 23 months following the pandemic's onset (Bryant et al., 2022). On average, students worldwide are eight months behind where they would have been without the pandemic. Students from Latin America, the Caribbean, and Southeast Asia experienced the most severe learning delays, potentially exceeding one year behind their expected learning trajectory. Students from schools in Sub-Saharan Africa, which had low levels of pre-pandemic learning, are estimated to be six months behind. In North America and Europe, which are considered to have high-performing systems, students experienced an average learning delay of four months; whether this affects students' future learning

and how the learning losses contribute to the already high number of students who drop out and do not attend school.

Following the COVID-19 pandemic, global absenteeism and dropout rates are expected to increase, including in high-income nations (Bryant et al., 2022). According to McKinsey & Company, the pandemic might have caused 1.7 to 3.3 million U.S. students to drop out of grades 8 to 12 (Bryant et al., 2022). This issue is likely more severe in low- and middle-income countries (Bryant et al., 2022).

Kaffenberger (2021) utilized a pedagogical production function model (Kaffenberger & Pritchett, 2020) to simulate the impact of COVID-19 school closures on learning in low- and middle-income countries. By introducing a three-month school closure shock for third-grade students, Kaffenberger (2021) aimed to project how this learning loss would affect their academic progress up to the tenth grade, comparing it with the projected progress had the pandemic not occurred. If learning in grade 3 is reduced by one-third to coincide with the expected duration of school closures, learning levels in grade 10 would be a full year lower than if the pandemic never occurred. However, if, as expected, students forget what they learn while away from school, this projection reaches a loss of 1.5 years of education at grade 10. If short-term remediation efforts include incorporating the three months of lost learning into the subsequent year's curriculum (i.e., grade 4), Kaffenberger (2021) estimates that learning loss would be cut in half by grade 10. However, a sixth-month delay is not necessarily the best outcome for this student. However, according to Kaffenberger (2021), the best-case scenario involves combining short-term remediation efforts with teaching learners at their current level of learning. In this scenario, there will be no learning setbacks over time. Instead, Kaffenberger's projections suggest that the learning progress may surpass its projected trajectory if the pandemic had not occurred.

Teaching children at their current level, which Kaffenberger (2021) suggests as a solution, is known in the literature as Teaching at the Right Level (TaRL). TaRL is an educational approach that assesses students' current learning levels and tailors instruction to meet their specific needs rather than following strict age- or grade-based curriculum expectations (Banerjee et al., 2017; Diniyarti & Agustika, 2023). This method helps children who have fallen behind to catch up and has been recognized as a viable solution for addressing learning deficits in the global education crisis (Azevedo et al., 2019; Azim Premji Foundation Research Group, 2021; UNESCO et al., 2021; World Bank, 2018). **It is precisely at this interchange where online learning and its benefit of personalized learning and ongoing measurement show promise as a solution to the learning crisis.**

The pandemic rapidly shifted education towards online learning worldwide. It significantly accelerated technology-assisted learning without introducing new trends (Goujon, 2022). Prompted by

lockdowns and health protocols, governments partnered with tech companies to implement distance learning, creating a large market for the global education industry (Williamson & Hogan, 2020). Besides, HolonIQ (2020) reports that the global education technology market, valued at 227 billion USD in 2020, is projected to grow to 404 billion USD by 2025. Some authors (e.g., Ra et al., 2021; Williamson & Hogan, 2020) optimistically suggest this shift could be a pivotal moment in education, raising the question of whether this 'new normal' might lead to the establishment of a 'learning society'—a concept promoting lifelong and widespread access to education.

These statistics and analyses clearly illustrate the severity and complexity of the global learning crisis. The data not only underscores the vast disparities in educational outcomes between high-income and low-income countries but also highlights the deep-rooted issues exacerbated by the COVID-19 pandemic. As we have seen, increased enrollment does not necessarily equate to improved learning, and the pandemic has only intensified the challenges faced by students and educators worldwide. This leads us to a crucial question: To what extent has the traditional education system contributed to these troubling trends? In the next section, we will delve into how conventional schooling practices may be partly responsible for the current state of global education and explore potential pathways for reform.

4. Traditional Education's Contribution to the Global Learning Crisis

How do student boredom, engagement, and enjoyment within traditional education contribute to the global education crisis? Below, I outline these concepts and use established research to argue that the conventional education system may impact the global learning crisis more than is often recognized. Understanding how classroom activities or training sessions impact boredom, engagement, and enjoyment requires a well-supported theoretical model that explains these concepts in various settings, such as traditional in-class learning, online learning, and blended learning environments. Additionally, it should clarify how changes in these experiences affect learning outcomes. For this purpose, the control-value theory of emotions (Pekrun, 2006; Pekrun et al., 2002) offers a valuable framework.

4.1. Control Value Theory of Emotions

Control Value Theory (CVT) is well-regarded in educational psychology. Research consistently emphasizes CVT's role as a critical framework for understanding how emotions like boredom (Bekker et al., 2023; Li, 2021; Tze et al., 2016), enjoyment (Heckel & Ringeisen, 2017; Tze et al., 2016)**,** engagement (Linnenbrink-Garcia et al., 2011; Sharp et al., 2020), and anxiety (Camacho-Morles et al., 2021; Pekrun et al., 2002, 2017; Zhao et al., 2021) influence learning outcomes. However, single studies are insufficient to verify the usefulness of a theoretical framework such as CVT. Evidence from systematic reviews and meta-analyses is considered more robust by researchers and policymakers because these methodologies allow for more comprehensive conclusions about an effect, such as the impact of boredom on learning, from a large body of studies (for a review, see Le Grange & Van Den Noortgate, 2024, pp. 3–18).

Notably, several systematic reviews (e.g., Wen & Dubé, 2022; Wu & Yu, 2022) and meta-analyses (e.g., Camacho-Morles et al., 2021; Tze et al., 2016) validate how CVT explains the relationship between the emotional, behavioral, and cognitive experiences of boredom, engagement, and enjoyment in predicting learning success. Despite cultural differences in the experience of achievement emotions in educational settings (see Fan et al., 2019; Frenzel et al., 2007; Guo et al., 2021; Pekrun et al., 2011), CVT's prediction of emotions based on appraisals holds across cultures (Frenzel et al., 2007; Luszczynska et al., 2005; Pekrun & Goetz, 2023). Moreover, the fundamental principles of CVT, concerning how appraisals and emotions impact student learning, have been validated across various

subjects in traditional (Camacho-Morles et al., 2021; Pekrun et al., 2002), online (Heckel & Ringeisen, 2017; Loderer et al., 2020), and blended learning environments (Acosta-Gonzaga & Ramirez-Arellano, 2021; Butz et al., 2015). **In conclusion, the widespread validation of CVT across diverse educational settings and cultural contexts underscores its robustness and pivotal role in predicting and enhancing student learning through understanding achievement emotions.**

CVT is a theory that describes the causes and effects of emotions in educational settings (Pekrun, 2006; Pekrun et al., 2002, 2007)**.** The theory posits that emotions experienced during learning, such as enjoyment or boredom, come from a student's *assessment* of learning tasks and explains how these emotions influence learning outcomes (Pekrun, 2006; Pekrun et al., 2017). CVT holds a broad view where emotions are defined as an individual's responses to *objects*, which refers to ongoing actions, persons, events, and so forth (Pekrun, 2006). In typical classroom settings, students' subjective assessments can be about a range of objects, such as following along with the lecture, making notes, collaborating with classmates, etc.

In CVT, emotions are not solely affective experiences (i.e., feelings) but multidimensional constructs involving affective, cognitive, motivational, expressive, and physiological processes (Pekrun, 2006). For example, a student in an important class for her degree may struggle with the fast pace of the lecture (low control) despite their assessment that the class is vital for their degree (high value). This perceived lack of control in a high-value situation can lead to anxiety, making the student **feel** overwhelmed, uneasy, and stressed (Pekrun, 2006). In this anxious state, intrusive **thoughts** (i.e., cognitions) such as "I do not think I will pass" consume valuable working memory, hindering the student's ability to focus and understand the lecture (Pekrun, 2006; Pekrun et al., 2011). Consequently, the student's grades may suffer. Suppose the student cannot manage this anxiety. In that case, it often leads to rote memorization of facts (i.e., **behavioral or expressive process**) rather than a deeper understanding and application of the material (Pekrun, 2006). Instead of fostering proactive and adaptable learning, anxiety frequently results in surface-level comprehension focused on memorization (Pekrun, 2006), and consequently, the acquisition of skills suffers.

The *assessments* students make about *objects*, such as the abovementioned student's assessment of having low control in an important class, are called ***cognitive appraisals*** and act as filters through which students experience academic settings (Pekrun, 2006). These cognitive appraisals are also seen as a proximal influence of emotions, influencing their motivation and learning behavior (Pekrun & Goetz, 2024). As illustrated in the example above, the student's learning and lack of material integration may also influence how they feel in subsequent classes on this subject. This shows how initial appraisal

of the lecture influences their subsequent motivations and learning behaviors, which in turn influences how these lectures influence their emotions further down the line (Pekrun & Goetz, 2024).

4.1.1. Appraisals

CVT emphasizes two main types of appraisals: perceived control and task value. The theory suggests that the particular mix of these appraisals dictates a student's emotions, needing both control and value to trigger an emotion. When students are in class, they form control and value appraisal about their achievement activities (e.g., participating in class, listening attentively, engaging in discussion, or taking notes) and the outcomes of these activities (e.g., acquisition of skills). *Perceived control* refers to an individual's belief in their ability to influence a task and its outcome (Pekrun, 2006)**.** This belief is shaped by factors such as students' perception of their skills and knowledge and external elements like task difficulty and classroom environment (Heckel & Ringeisen, 2017). Task value, the second type of cognitive appraisal, pertains to the subjective significance, worth, or perceived value individuals assign to achievement-related activities and their outcomes(Pekrun, 2006; Pekrun et al., 2010). Here, Pekrun and Goetz (2024) distinguished tasks students perceive as having intrinsic and extrinsic value. Intrinsic value refers to appraisals of an achievement activity's inherent desirability, attractiveness, or lack thereof without reference to its outcomes. For instance, a student who enjoys reading for pleasure demonstrates high intrinsic value for reading. In contrast, extrinsic value refers to the perceived utility of an activity in achieving external rewards or avoiding negative consequences. A student who studies hard to get good grades or please their parents is driven by extrinsic value appraisals.

4.1.2. Dimensionality of Achievement Emotions

Student's appraisal of control and value directly influences the valence (i.e., positive or negative) and activation (i.e., activating or deactivating) of achievement emotions (Pekrun et al., 2002).

When students feel a strong sense of control over (**high control**) their learning and find the activities and potential outcomes valuable (**high value**), they are more likely to experience **activating positive emotions** such as enjoyment, hope, and pride during the learning process (Camacho-Morles et al., 2019; Pekrun, 2006; Pekrun et al., 2002, 2010).

When students feel a high sense of control (**high control)** in **control** but negatively appraise an achievement activity (**low value**), they might experience **deactivating positive emotions** such as relief or relaxation (Pekrun et al., 2002, 2017). For instance, a student might feel relieved after finishing a

difficult task, not because it was enjoyable or valuable, but because they avoided a negative result. This relief can cause them to disengage from further learning, shifting their motivation from genuine interest (intrinsic motivation) to merely avoiding negative outcomes (extrinsic motivation).

When students perceive **low control** over their learning and simultaneously assign negative value (**low value**) to the activities or outcomes, they are more prone to experiencing **activating negative emotions** such as anger, anxiety, and shame (Pekrun, 2006; Pekrun et al., 2002). For example, a student who feels lost and incapable of grasping a concept (low control) and perceives the upcoming test as a threat to their grade (negative value) is likely to experience anxiety. In our example of the 'anxious student,' I indicated how anxiety can interfere with learning by reducing the student's cognitive resources via intrusive thoughts and intrinsic motivation. While this is in line with findings of CVT, anxiety can also "trigger [a student's][7] extrinsic motivation to invest effort to avoid failure" (Pekrun et al., 2017, p. 1655).

Deactivating negative emotions, such as boredom, follows a different pattern than the aforementioned (Pekrun & Goetz, 2024). Boredom often arises when a student perceives a task as having low value (Pekrun & Goetz, 2024). Despite the value a student attributes to a learning task, they may also experience boredom when the task is either over- or under-challenging, typified as low or high control, respectively (Pekrun & Goetz, 2024). A nuanced picture emerges here since low value alone can trigger boredom. However, as Pekrun and Goetz (2024) illustrate, boredom can be understood if one considers that value interacts with control in a classroom setting. When tasks are too easy (high control), they can become boring over time, reducing their intrinsic value. On the other hand, when tasks are too difficult, a student's lack of understanding can reduce the task's meaningfulness and intrinsic value (low value).

It is easy to see how this applies to the global learning crisis, where a high teacher-to-student ratio characterizes traditional classes. Learning poverty and COVID-related learning losses create a plausible scenario where such a classroom is filled with students who can effortlessly master a task being taught and, conversely, students who are so far behind that they cannot follow. In both these scenarios, it is plausible that both sets of students may experience boredom at one time or another, which may impede their learning. For example, unchallenging content may influence perceptions of high control or low personal relevance. On the other hand, students who find the current curriculum content too challenging may feel bored due to appraisals of low control over the content. Therefore, given this possible scenario, it is imperative to understand the relationship between boredom, engagement,

7 Own insertion.

enjoyment, and learning outcomes in traditional classes and how they affect students' learning. Such an understanding would allow for a clear delineation of how the didactic characteristics of traditional face-to-face classrooms are, *at least partly*[8], responsible for the education-learning gap.

4.1.3. Engagement

So far, the report has established enjoyment as a positive deactivating emotion and boredom as a negative deactivating emotion. However, what remains to be seen is how CVT views engagement and how it ties in with boredom and enjoyment. In CVT, engagement is not considered an emotion. Instead, engagement is viewed as an outcome of achievement emotions (e.g., boredom, enjoyment), which are themselves influenced by value and control appraisals (Bekker et al., 2023; Camacho-Morles et al., 2019).

Engagement in CVT is typically understood as a multidimensional construct comprising behavioral, cognitive, and emotional aspects (Fredricks et al., 2004; Wong & Liem, 2022). *Behavioral engagement* is an individual's observable participation in learning activities(Fredricks et al., 2004) through active involvement and effort in the classroom, increased task persistence, and improved concentration (Fredricks et al., 2004; Skinner et al., 2009). *Cognitive engagement* signifies mental exertion and active information processing during learning (Fredricks et al., 2004). Cognitive engagement signifies mental exertion and active information processing during learning (Fredricks et al., 2004). Students with high cognitive engagement use strategic approaches to learning. They apply metacognitive strategies to plan, monitor, and assess their learning (Fredricks et al., 2004). They also use techniques like rehearsal, summarizing, and elaboration to improve understanding and memory(Fredricks et al., 2004). *Emotional engagement* ties in with the affective experiences that students experience in the classroom and towards their teachers (Wong & Liem, 2022). Positive affect, such as enjoyment and interest, or negative affect, such as boredom, are described as emotional engagement (Pekrun & Goetz, 2024; Wong & Liem, 2022).

4.2. Boredom, Traditional Classrooms, and The Global Education Crisis

International research has consistently identified boredom as one of the most common academic emotions experienced worldwide (Goetz et al., 2006; Gu et al., 2023; Martz et al., 2018).

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8 I stress the plausibility of this assertion since there is no empirical research, yet, that investigates this. However, from the research reviewed, I deem it a big possibility that this assertion is true.

Goetz et al. (2024) provide examples of this research from various regions, including the United States, Asia, Europe, and Africa. Martz et al.'s (2018) study of U.S. adolescents revealed that about 20% reported high levels of boredom. This is not a trivial finding since the data was based on a nationally representative sample of 8th and 10th graders (N = 21,173; 51.8% female) from the Monitoring the Future survey. Gu et al. (2023) conducted a meta-analysis of 64 research articles to compare boredom in Chinese college students and U.S. secondary school students. Boredom levels have increased significantly among U.S. secondary school students from 2008 to 2017. Similarly, Chinese college students markedly rose in boredom proneness from 2009 to 2020. Another study by Goetz and colleagues (2006) reported that middle school students experienced boredom 32% of the time in the classroom, indicating that it is a more common emotion than anxiety. These findings underscore the widespread nature of boredom in educational settings across different countries and age groups.

Tze et al. (2016) conducted a meta-analysis of 29 studies published between 1990 and 2014, encompassing 19,052 secondary school and university students. Their primary aim was to examine the connection between academic boredom, learning strategies, and achievement. Tze et al. (2016) found that boredom had the most substantial negative relationship with academic motivation ($r = -.40$), followed by study strategies and behaviors ($r = -.35$), and lastly, achievement ($r = -.16$). This finding suggests that students who experience higher levels of boredom tend to have lower levels of motivation, less effective study strategies, and poorer academic performance. This can lead to disengagement from learning activities. Notably, The negative correlation was more robust when students experienced boredom in class in class ($r = -.35$) compared to when it was experienced while studying ($r = -.25$). They explain this by stating that students might have fewer options for coping with boredom in a classroom setting. Whereas a student studying independently can take a break, change their approach to the material, or switch to a different task, classroom learning often requires students to conform to a set schedule and pace, even when they find the material or instruction uninteresting.

In another meta-analysis, Camacho-Morles et al. (2021) reviewed 68 studies from 1986 to 2019 involving 28,410 participants to explore the link between emotions (i.e., enjoyment, anger, frustration, boredom) and academic performance. The study found that boredom moderately negatively affects academic performance ($\rho = -.25$), indicating that increased boredom leads to lower academic performance. Moreover, the meta-analysis highlighted that boredom is a common and persistent emotion among students. The authors suggest that boredom may negatively impact academic achievement by reducing students' intrinsic motivation and engagement in academic tasks. This could lead to decreased behavioral engagement and thus affect students' performance on academic tasks. The

authors also propose that boredom may influence academic performance by diminishing students' attention (cognitive engagement) during academic tasks.

These reviews' findings align with the proposed mechanisms and processes that link boredom with academic achievement. Boredom in class significantly impacts academic outcomes, affecting multiple learning mechanisms, according to Pekrun et al. (2010):

1. Boredom diverts attention from classroom tasks, causing students to daydream, become easily distracted, or engage in irrelevant thoughts. Thus, boredom reduces the cognitive resources available for learning and hinders academic performance.
2. Boredom adversely affects both intrinsic and extrinsic motivation. Its aversive nature makes students want to avoid classroom activities, diminishing intrinsic motivation.
3. Because boredom is associated with a perceived lack of value in classroom activities, it also reduces the extrinsic value of completing them, leading to decreased effort and participation.
4. Boredom impairs the use of effective learning strategies and self-regulation.

For example, a study of 287 first-year students found that classroom boredom significantly and negatively predicted students' final course grades even when controlling for prior academic achievement (Pekrun et al., 2010). Furthermore, Pekrun et al. (2010) emphasize that this relationship is likely reciprocal: boredom in class negatively impacts academic performance, and poor academic performance can exacerbate feelings of boredom. It is no wonder why almost half (47%) of U.S. high school students drop out of high school as a result of uninteresting classes, feeling bored, and disconnected (Bridgeland et al., 2006).

4.2.1. Global Learning Crisis and Classroom Boredom

We have already emphasized one way the traditional classroom can be responsible for the global learning crisis. If half the children in low- and middle-income countries cannot understand or read a simple text by age 10, a classroom might consist of students with varying levels of skills. This is especially true for overpopulated classrooms in low-income countries World Bank (2018). One study in India, for example, revealed that students in a single grade can have academic performance levels that vary by five to six grades (Muralidharan et al., 2016). **In terms of CVT, students may experience boredom in these classrooms, given that high and low control appraisals are present for these students.**

On the one hand, children find the activities too easy (high control), and on the other hand, some children in these classrooms may find the work way beyond their skill level. Matching task demands to student competencies is essential for cultivating a sense of control because it strikes a balance between overwhelmed and underwhelmed students (Goetz et al., 2024). However, it is a daunting task in overcrowded classrooms with students with highly varied skill sets. In addition, giving special attention to students will also be lacking in overcrowded classrooms, making necessary one-to-one explanations of a subject's personal relevance (increasing value appraisal) impossible. Normal, one-size-fits-all curriculum teaching just does not cut it in these circumstances.

However, assuming that some high-income classrooms consist of children with homogenous levels of skills, teaching at the level of the student remains a difficult task. One way to facilitate this is for teachers to monitor the students' affective and behavioral experiences (e.g., feeling overwhelmed, daydreaming, etc.) and adjust their delivery accordingly (Goetz et al., 2024). While this may be difficult in overcrowded classrooms, it may be equally challenging in smaller classrooms where individual attention is more straightforward. This is because it has also been shown that even accomplished teachers fail to detect changes and accurately identify students' affective states in a classroom setting (Mello et al., 2008).

Traditional learning environments often emphasize the passive reception of information, which can lead to a perceived lack of value and control (Bekker et al., 2023; De La Peña, 2023; Pekrun, 2006). Students are expected to sit passively while an instructor delivers lectures, which may or may not be engaging or relevant to their lives. Moreover, passive learning often fails to provide students with opportunities to make choices, provide input, or exert influence over the pacing or direction of their learning (compare with: Bekker et al., 2023; De La Peña, 2023; Nett et al., 2011). These factors can diminish students' sense of agency and contribute to feelings of apathy or indifference toward the subject matter.

Another cause of the global learning crisis is teachers' inadequate training to teach at the required level. In fact, many teachers struggle to demonstrate mastery of the subjects they are expected to teach, often performing no better in subject knowledge assessments than their highest-performing students (World Bank, 2018). In such cases, teachers will not have the skills to engage students effectively. They may not, for example, be able to convey the importance of a concept and link it to previous concepts and activities. This contrasts with research that shows that If learners understand the importance of learning and learning-related activities, it will also contribute to their sense of control

(Bekker et al., 2023; Pekrun, 2006). This is, of course, only one possible way in which incompetent teachers may contribute to student disengagement and boredom.

In our review, we have established a strong link between boredom and academic achievement. Additionally, we argued that certain aspects of traditional classroom learning contribute to reduced learning. Specifically, we identified the critical factors of overcrowded classrooms: lack of personal relevance and control, insufficient monitoring of negative student emotions, passive learning strategies, and diminished student autonomy. These aspects may be significant reasons why education is not translating to effective learning on a global scale.

4.3. Enjoyment, Traditional Classrooms, and The Global Education Crisis

Above, I identified enjoyment as a positive activating emotion arising from perceptions of high control and high value. In CVT, this emotion typically occurs during ongoing activities, classifying it as an activity emotion (Pekrun & Goetz, 2024). Several mechanisms suggest how experiencing enjoyment in class may enhance academic performance. For instance, like other positive emotions, enjoyment frees up cognitive resources, enabling better focus on tasks (Pekrun, 2006; Pekrun et al., 2002). Unlike anxiety, which diverts attention and diminishes mental resources through intrusive thoughts or heightened arousal, enjoyment increases a student's interest and focus, often leading to deep immersion in the learning activity (Pekrun, 2006). Additionally, enjoyment promotes flexible learning strategies and creative approaches to academic challenges (Pekrun et al., 2017).

It is important to note that enjoyment, engagement, and academic success are interlinked in a cyclical relationship (Pekrun 2006, Pekrun et al., 2017). Initial enjoyment in the classroom can boost engagement, leading to better learning gains, which further enhances feelings of competence and joy, creating a positive feedback loop (Pekrun, 2006; Pekrun et al., 2017).

The link between enjoyment and academic outcomes has been established in academic research. Camacho-Morles et al. (2021) meta-analysis, comprising a substantial data set of 57 independent samples with a total of 31,868 participants (primary, secondary, and university students), found a moderately high effect ($\rho = .27$) of enjoyment on academic performance. Camacho-Morles et al. (2021), however, did not analyze mediating or moderating factors to explain this effect. They did, nevertheless, provide theoretical reasons for the high achievement scores. Camacho-Morles and colleagues stated that enjoyment as a positive activating emotion most likely leads to increased attention, enhanced cognitive flexibility, intrinsic motivation, and self-regulated learning strategies in

the learner. Therefore, enjoyment leads to the actions associated with high achievement and, therefore, affects high achievement. Nevertheless, these findings are only theoretical suggestions. However, the elaborate study of Pekrun et al. (2002), which used cross-sectional, longitudinal, and diary studies to study college and school students, reached this conclusion.

The findings of Pekrun et al. (2002) showed that enjoyment was consistently linked to better academic scores. Enjoyment was positively correlated with intrinsic motivation, extrinsic motivation, effort, and the use of flexible learning strategies such as elaboration, organization, and critical thinking. Enjoyment was also associated with lower levels of task-irrelevant thinking and a higher perception of self-regulated learning. These findings have particular relevance to the classroom setting as they suggest that when students experience enjoyment in their learning activities, they are more likely to engage deeply and persistently with the material. This positive activating emotion fosters both intrinsic motivation—where students find the activity itself rewarding—and extrinsic motivation, driven by external rewards or recognition.

Furthermore, according to Pekrun and colleagues (2002), enjoyment promotes the application of advanced cognitive strategies. Students who enjoy their learning are more inclined to use elaboration, organization, and critical thinking, essential for deep learning and understanding. These strategies enable students to make meaningful connections, structure their knowledge effectively, and critically evaluate information, leading to better academic outcomes.

4.3.1. Global Learning Crisis and Classroom Enjoyment

Given the importance of enjoyment in learning, it is crucial to figure out how known causes of the global learning crisis may decrease learner boredom. While such a delineation was more straightforward in my discussion of boredom above, it is trickier in this instance. Tricky, in the sense that the link between the causes of the global learning crisis and enjoyment requires a set of assumptions that may not hold for classrooms in low- and middle-income countries, as well as high-income countries. In the section below, I therefore discuss how the typical face-to-face classroom may lead to decreased enjoyment and disengagement. This would allow for an indirect link between a lack of enjoyment and the global learning crisis, especially given learner enjoyment's known effect on their engagement and academic performance. In addition to this, I will try to link the known causes of the global learning crisis and suggest how they may decrease learner enjoyment.

In a traditional classroom setting, students may not enjoy learning due to the lack of stimulation and autonomy in the learning process. Traditional classrooms' routine and passive learning

nature contrast with the stimulating environments students experience outside of school (e.g., TikTok, YouTube, etc.), leading to boredom and disinterest (De La Peña, 2023). Teachers may feel pressured to entertain students to maintain attention in such situations(De La Peña, 2023). Authors such as De La Peña (2023) and Emenyeonu (2012) suggest that traditional classrooms do not allow students to be independent agents in the learning process but passive consumers of lecture content. Being part of the learning process, making choices, and co-creating are ways of engaging students in the learning process and decreasing their boredom. This lack of autonomy and choice in classroom tasks may make the educational experience unenjoyable (Pekrun & Goetz, 2024). Therefore, passive, non-participatory forms of learning characteristic of traditional education settings may hamper enjoyment, a valuable emotion that may translate to better learning outcomes for children. It is, therefore, plausible that the traditional forms of face-to-face education do not translate into learning.

While teachers are central in solving the learning crisis, a key driver of the global learning crisis is the poor quality of teaching in many developing countries (Bold et al., 2017; World Bank, 2018). Teacher deficiencies, such as inadequate subject knowledge and pedagogical skills, lead to ineffective teaching practices. Furthermore, classroom observations often reveal an over-reliance on rote learning and traditional lecture-based methods, which limit opportunities for student engagement, active participation, and the development of higher-order thinking skills. Additionally, teachers frequently face challenging working conditions, insufficient support, and inadequate professional development opportunities, resulting in low morale and reduced motivation to create stimulating learning experiences. Together, these factors contribute significantly to the global learning crisis by diminishing students' enjoyment of learning.

5. Online Learning: CourseClout's Role

The extent of the global learning crisis is often challenging to estimate due in part to macro- and micro-measurement problems. At the macro measurement level, governments measure enrollment levels, but a lack of clear and comprehensive levels of learning makes it difficult to compare learning across countries (Angrist, 2022; Azevedo et al., 2019; Bold et al., 2017; World Bank, 2018). As Azevedo et al. (2019) admit, governments can easily hide behind data on increased enrollment and, without reliable measurement of learning outcomes, easily ignore the real problem of the global education crisis. Without the reliable and timely assessments necessary to gauge the effectiveness of education systems, solving the education crisis would amount to nothing more than trying to get blood from a stone. (World Bank, 2018). Without data on learning, it is impossible to identify what is going wrong, hindering the development of effective, context-specific solutions. **While this is true for addressing the global learning crisis at the macro level, it also shows how digital technology can be leveraged to measure and address individual learning problems.**

5.1. Adaptive Learning Systems: Addressing Learning Gaps and Addressing Teacher Incompetence.

Online learning and broader education technologies can track learner progress and help teachers identify which learners need extra attention (Ra et al., 2021). Online learning platforms, like those used by Acosta-Gonzaga and Ramirez-Arellano (2021), can track student interactions with content, such as the number of items reviewed in each module, allowing teachers to identify which topics students engage with and where they may be struggling. For example, in a blended learning environment, a platform like Moodle can log online examinations, learning activities, and projects, providing student engagement and comprehension data.

In this instance, companies CourseClout provides adaptive learning management systems that may help track student progress. In this way, boredom can be mitigated by teachers adapting their instruction to the relevant level of the child. The child increases their control over the material, and the information becomes of personal value, meeting them where they are. Nevertheless, classes worldwide are characterized by a high student-to-teacher ratio, making such personable attention from teachers impossible. So, while the information on learning gaps might be helpful, it may not necessarily translate to the individual attention needed by a student. **This is where adaptive learning systems come in.**

Leveraging artificial intelligence (AI), companies like Courseclout can create adaptive learning systems that tailor the speed and content of lessons to each student's needs (Ra et al., 2021; Romero & Ventura, 2020)**.** These systems use algorithms to monitor performance to pinpoint where extra help is needed. For instance, if a student struggles with a science concept, the system offers extra problems, videos, or simulations until mastery is achieved. Mindspark centers used adaptive software in India to tailor learning content to each student's abilities and progress rate. Students who attended after-school for four and a half months saw their reading progress more than double (Azevedo et al., 2019). In another study, Mindspark has been used to address students' mathematic scores. Using Mindspark, Muralidharan et al. (2016) successfully addressed students' learning gaps, with mathematic assessment scores improving up to 38% in less than six months[9]. **This can also be extended to teacher incompetence in low- and middle-income countries.**

In this instance, CourseClout's extensive experience with creating end-to-end online course content and learning management systems is sound for employee training. Examples include creating systems that address, monitor, and strengthen teacher skills in low- and middle-income countries. For example, in South Africa, teachers often struggle with English as a second language; as a result, learners bear the brunt of this. Kotze et al. (2019) evaluated a comprehensive sample of schools to compare two teacher training methods and their effectiveness on teaching practices and students' English language performance. They found that one method used paper-based lesson plans and in-person coaching, while the other used tablet-based lesson plans with video demonstration and e-coaching. The study showed that the electronic method was as effective as the paper-based method but was considerably more cost-effective. This suggests the usefulness of interventions like these in under-resourced communities since teacher incompetence is particularly prevalent in such areas.

In conclusion, online learning platforms, such as those provided by CourseClout, play a pivotal role in addressing the global learning crisis by leveraging technology to provide adaptive learning systems. These systems not only track and respond to individual student needs but also offer scalable solutions to improve teacher competency, especially in low- and middle-income countries. By harnessing the power of artificial intelligence, CourseClout can tailor educational content to meet each student's unique learning pace and requirements, thereby mitigating boredom and enhancing engagement. Furthermore, technology integration in teacher training, as demonstrated in South Africa, highlights the potential of digital tools to offer cost-effective and efficient methods to elevate teaching

9 This was done in India, thereby casting doubt on the idea that certain educational technologies cannot be effectively deployed in low income countries.

standards. Overall, the strategic implementation of online learning technologies presents a promising avenue for bridging educational gaps and fostering a more equitable and effective global education system.

6. Conclusion

This report explores the critical role of online learning in addressing the global learning crisis. It focuses on how online learning helps to tackle student boredom, improve engagement, and enhance learning outcomes. The global learning crisis stems not only from insufficient access to education but also from the poor quality of education that fails to equip students with essential cognitive skills needed in the workplace and society. Traditional education systems often result in high levels of student disengagement and boredom, diminishing learning and exacerbating the gap between enrollment and actual learning.

The Control-Value Theory (CVT) of emotions offers a comprehensive framework for understanding how students' emotions, such as boredom and enjoyment, affect their engagement and learning outcomes. Traditional education settings, especially those with high teacher-to-student ratios, risk failing to meet students' control and value appraisals, leading to negative emotions that hinder learning. On the other hand, online learning environments, with their adaptive learning systems and engaging content, can better align with students' needs, enhancing control and value appraisals and fostering positive emotions like enjoyment.

CourseClout's services demonstrate how online learning platforms can address these challenges by providing personalized, adaptive learning experiences. Using technology to track progress and tailor educational content, online learning can offer a more engaging and effective learning environment, reduce learning losses, and plausibly support low-skilled/overburdened teachers in low- and middle-income countries.

Additionally, the report emphasized the significant potential of online learning to mitigate learning losses exacerbated by the COVID-19 pandemic. The pandemic has accelerated technology adoption in education, offering an opportunity to reimagine education systems to be more resilient and responsive to students' needs.

In conclusion, addressing the global learning crisis requires a multifaceted approach that includes enhancing the quality of education and making it more engaging and relevant to students. Online learning, supported by companies like CourseClout, offers a promising solution to these

challenges. Online learning can be crucial in supplementing policy addressing the learning crisis by reducing boredom, increasing engagement, and providing high-quality educational experiences. Doing so can aid the acceleration towards SDG 4 by providing quality education for all.

7. Remaining Questions and Gaps

Below, I highlight some of the remaining questions and gaps that can be explored in future CourseClout reports:

1. What are the specific methods CourseClout uses to reduce learner boredom and increase engagement in online learning?
2. How do online and blended learning environments compare in addressing the global education crisis, and what are the key differences in teaching quality, boredom, enjoyment, and engagement in these settings?
3. How does prolonged use of online learning platforms impact students' cognitive development and job market readiness?
4. What strategies can ensure equitable access to online learning resources across low-, middle- and high-income countries?

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