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# An examination of the impact of computing on educational methodologies and their implications for industry and culture.

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**ABSTRACT**

Based on research, this dissertation subject focusses on the many individuals, including politicians, investors, and others, who have contributed to the development, criticism, and study of the educational potential of information and communication technology (ICT). The use of constructivist pedagogy in combination with information and communication technology has been shown to be the most effective method with which to use these technologies. Before information and communication technology may be completely integrated, there are many steps that need to be followed. As a result of the key role that they play in facilitating the adoption of information and communication technology (ICT), teachers are often held accountable for the ineffective integration of ICT in the classroom. The purpose of this project is to educate, empower, and motivate educators to use information and communication technology (ICT) into their teaching techniques. This project is built on a professional development approach that is based on research. For the effective use of information and communication technology (ICT), it is vital to have a professional development program that focusses only on the components of ICT that are relevant to educators.

**Keywords:** *Computing culture, Industry, Influence of computing, Technology, Classroom instructions.*

## 1. INTRODUCTION:

Over the last two decades, several forms of information and communication technology have become much more approachable and suitable for the average American classroom. Every dollar spent on classroom technology, every initiative enacted by state and federal governments, and every claim made about ICT's capacity to enhance American education points to teachers constantly and intensively using it. Even though technology has been more widespread in recent years, most students still do not get education that utilises ICT (Fields et al., 2018).

The country's schools are seeing an influx of students who have grown up with technology. Technology has enhanced and even created their day-to-day lives, leisure alternatives, social connections, and future goals. One such breakthrough is information and communication technology (ICT). In contrast to other parts of the economy, the American educational system has been largely unaffected by the growth of digital communication technology. According to García-Peñalvo and Mendes (2018), students are falling behind because schools are clinging to the Industrial Age, even though the world is transitioning to the Information Age. New research suggests that the present

integration gap is mostly due to teachers' lack of preparation and support in using ICT successfully in the classroom. A number of institutions have started to include technology instruction into teacher training programs in response to government licencing regulations, with the goal of bridging the digital gap between students and professionals. However, according to García-Peñalvo and Mendes (2018), there is little connection between researching ways to use ICT and actually implementing these strategies into teachers' everyday lesson plans (García-Peñalvo and Mendes, 2018).

## 2. BACKGROUND OF THE STUDY:

In 1983, A Nation at Risk was released by the Commission for Excellence in Education. An idea put out in A Nation at Risk was to make computer science a required course for all high school students. The importance of innovation as the primary determinant of a country's prosperity was reaffirmed in A Nation at Risk. The arrogance of blaming the United States' educational system for the country's economic woes is on full display in A Nation at Risk. However, a movement for educational reform in the United States did begin with it. Worldwide, especially in the United States, educational programs have maintained their usage of ICT since the report's 2008 publication. Even though a lot has changed since A Nation at Risk, some people think that all students should still have to take a technology class (Allen, 2008). There are a lot of government technology documents that talk about different parts of integrated technology, but they all stress the need for reliable hardware that is easily accessible. The need for improved teacher preparation to effectively incorporate technology into the classroom was emphasised in both the National Technology Plan of 2000 and A Nation at Risk.

The No Child Left Behind Act was passed by both chambers of Congress in 2001. In January 2002, Bush signed the proposal into law. Restoring lost student agency and putting a stop to the literacy crisis were the driving forces behind the passage of this law. No Child Left Behind was defined by the federal government's resolve to implement changes based on scientific evidence and by the expansion of parental involvement in their children's education. Additionally, it demanded more from students so that they wouldn't bring their sluggish expectations into the next grade and teacher. In addition to the more traditional skill of reading, research indicates that children should also be taught how to correctly use technological gadgets (Allen, 2008).

## 3. THE PURPOSE OF THE RESEARCH:

The school's advanced IT system and well-planned approach to technology are nonetheless largely underutilised in the majority of classrooms. Even while integrating technology into the core curriculum is necessary, the current approach to technology disregards the fundamental relevance of professional advancement in this subject. It is quite unlikely that the necessary skills for integrating ICT would be developed without this curriculum, given the little chances for professional progression. Other schools may be inspired to implement such programs to tackle other critical education concerns by this professional development strategy. This professional development course will educate instructors how to make the most of their school's technology budget each year while also helping students become

community leaders of the future. Improve the quality of education that children receive at this school by providing teachers with the resources they need to adopt the best practices in the classroom. This course will teach students the skills they need to succeed in the modern technology world (Brush et al., 2020). On top of that, there will be a strategy for each educator's professional growth. Students would gain a lot from taking this class: they would have a strong grounding in ICT, have their creativity spurred, work better with their instructors, and have plenty of opportunities to show off what they've learnt in class. For the sake of their students' education, it will most significantly enable them to maximise their limited resources.

Efforts to request more time from devoted instructors have always met with resistance. It is critical to persuade instructors that the program would benefit their children's professional development as well as their own. In order to lessen the likelihood of encountering strong opposition, it is recommended to begin with a smaller group of volunteer instructors rather than a school-wide initiative. In order to improve the course and make on-site professional development opportunities better for future cohorts, researchers should listen to the initial cohort of instructors' feedback.

## 4. LITERATURE REVIEW:

From the days of slates and chalk to the current day with computers and all the software and hardware they have, the use of technology in the classroom has come a long way. Science and engineering have worked relentlessly to enhance classroom teaching, and the United States' educational system has profited substantially from their discoveries and advances. Researchers mostly focused on emerging technologies that make up ICT, according to Hsu et al. (2018).

When personal computers first came out, there were some efforts to bring ICT into the classroom. A lot of work has gone into making personal computers more user-friendly in anticipation of their widespread usage in classrooms. The 1970s saw the first introduction of computers into school curricula. Desktop computers became increasingly useful in the classroom as a result of many developments in the 1980s. The advent of the Internet in the 1990s marked the end of the Information Age (Kwon et al., 2018).

Many additional developments in information and communication technology occurred at the same time as the expansion of the Internet, making these resources more widely available and practical in the classroom. In and out of the classroom, educators' use of technology increased dramatically. Hsu et al. (2019) noted that despite the creation and introduction of new forms of ICT, the majority of schools throughout the nation failed to incorporate them into their pedagogical methods (Hsu et al., 2019).

## 5. RESEARCH QUESTIONS:

- What is the effect of cultural analytics on the learning process?

## 6. METHODOLOGY:

### a. Research Design

To find statistically significant connections, quantitative researchers gather numerical data on variables and plug it into statistical models. Quantitative research aims to improve our understanding of society in the end. When studying topics pertaining to humans, researchers often use quantitative methodologies. The results of quantitative studies are often presented to the public via the use of tables and graphs. Quantitative data relies heavily on the methodical gathering and examination of numerical information. Some of their many potential uses include data averaging and forecasting, but they also have many other potential uses, such as investigating connections and generalising results to bigger populations. In contrast to quantitative research, qualitative studies rely on in-depth interviews and observations (via text, video, or audio). Many academic fields rely on numbers and statistics. Economics, sociology, biology, chemistry, and marketing are all parts of this broad area.

**b. Sampling**

Twenty Chinese consumers participated in the survey's pilot round, and 749 clients were included in the study's final sample. 800 surveys were sent to clients who were chosen at random. The researcher in this study disregarded respondents whose surveys were not filled out in full.

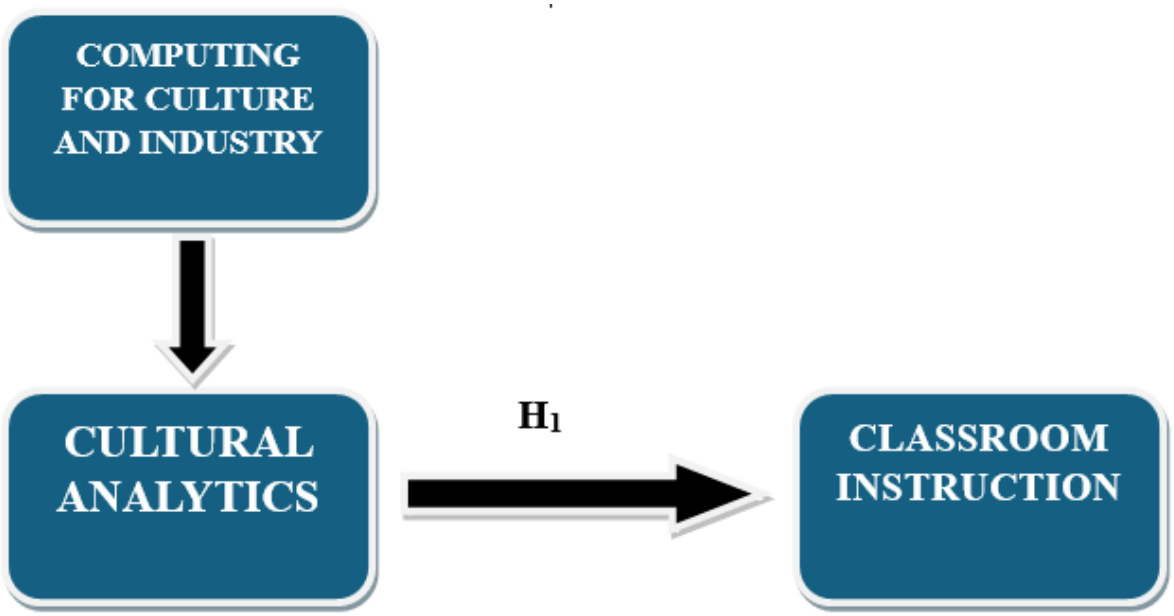
**c. Statistical Software**

The statistical analysis was conducted using SPSS 25 and MS-Excel.

**d. Statistical tools**

Using descriptive analysis, researchers were able to understand the data's essential nature. To determine validity, factor analysis was used.

- **Conceptual Framework:**




## 7. RESULTS:

Everyone who took part in the survey received one of the 900 questionnaires. An analysis was

conducted using the STSS version 25.0 software on 749 out of 875 surveys.

### 8.1 Factor Analysis

A prevalent use of Factor Analysis (FA) is to authenticate the foundational component structure of a set of measurement items. Latent factors are theoretically posited to explain the observed variable scores. This model-focused approach is termed accuracy analysis (FA). The primary aim is to demonstrate the relationships among variables, including the effects of measurement error and unobserved factors.

Researchers may use the Kaiser-Meyer-Olkin (KMO) Method to evaluate the suitability of data for factor analysis. The researcher assessed the sufficiency of the sample by evaluating each model variable individually and the total model collectively. The statistical measures assess the possible shared variance across many variables. The suitability of the data for component analysis is often improved when the ratio is reduced.

KMO produces values between zero and one. Sampling is deemed adequate if the KMO value ranges from 0.8 to 1.

Remedial action is necessary if the KMO is below 0.6, indicating inadequate sampling. Exercise good discretion; some authors employ 0.5 for this purpose, therefore defining a range of 0.5 to 0.6.

KMO If it approaches zero, it signifies that the overall correlations are negligible relative to the partial correlations. Component analysis is greatly hindered by strong correlations.

The following approval criteria set out by Kaiser are as follows:

Remarkably low, ranging from 0.050 to 0.059.

A score of 0.60–0.69 is substandard.

Middle grades often span from 0.70 to 0.79.

Demonstrating a quality point score ranging from 0.80 to 0.89.

There is considerable variation between 0.90 and 1.00.

**Table 1: KMO and Bartlett's Test[a]**

| KMO and Bartlett's Test[a] | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .858 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 4950.175 |
| | df | 190 |
| | Sig. | .000 |
| a. Based on correlations | | |

Claims made just for sampling reasons are really valid. The correlation matrices were subjected to Bartlett's Test of Sphericity to assess their significance. The Kaiser-Meyer-Olkin metric demonstrates that a sample adequacy value of 0.858 is appropriate. The researchers obtained a p-value of 0.00 via Bartlett's sphericity test. Results from Bartlett's sphericity test revealed that the correlation matrix is not an identity matrix, a noteworthy finding.

### 8.2 Test for hypothesis

Scientific organisations often "propose a hypothesis," which is fundamentally an informed conjecture or assumption, prior to engaging in discussions with fellow members and conducting tests to evaluate its validity. Scientific research starts with a thorough review of the topic to generate a testable hypothesis. The investigation's primary premise was correct. A "hypothesis" statement suffices to provide a plausible explanation for the observed phenomenon. Formulating and testing several hypotheses was essential for a thorough investigation.

- **DEPENDENT VARIABLE**
  - **Classroom Instruction**

The phrase "classroom instruction" describes the method of delivering and receiving educational content inside the institutional setting of a school. Lessons and other student-led activities make up the bulk of most curricula. Students improve their understanding and retention of the material by participating in a variety of interactive learning activities, including class discussions, practical demonstrations, and lectures. Teaching in the classroom should engage students, provide them with information and abilities, and encourage the development of their analytical thinking and problem-solving skills. Assessing student work, giving comments, and modifying courses to match the requirements of individual students are all components of effective classroom instruction (Hsu et al., 2019).

- **INDEPENDENT VARIABLE**
  - **Computing for Culture and Industry**

The phrase "classroom instruction" describes the method of delivering and receiving educational content inside the institutional setting of a school. Lessons and other student-led activities make up the bulk of most curricula. Students improve their understanding and retention of the material by participating in a variety of interactive learning activities, including class discussions, practical demonstrations, and lectures. Teaching in the classroom should engage students, provide them with information and abilities, and encourage the development of their analytical thinking and problem-solving skills. Assessing student work, giving comments, and modifying courses to match the requirements of individual students are all components of effective classroom instruction.

- **FACTOR**
  - **Cultural Analytics**

The multidisciplinary study of cultural phenomena via the use of computer and data analytic methodologies is known as cultural analytics. This approach integrates digital humanities, data visualisation, and computer science technologies with more conventional methods from the social sciences and the arts.

In order to get a better understanding of human behaviour, creativity, and cultural creation, this area studies and interprets massive amounts of cultural data, including text, pictures, videos, and other forms of media. Some areas that have found use for it include literary and linguistic development,

social media content analysis for cultural dynamics, and art historical trend analysis (Kwon et al., 2020).

- **Relationship between Cultural Analytics and Classroom Instruction**

In this context, "cultural analytics" is the study of cultural practices, data, and patterns via the use of computational methodologies, big data, and machine learning. This study then informs us of the tactics and methods utilised in the classroom. This partnership investigates how cultural analytics might help teachers better understand and cater to their students' individual learning styles.

Teachers can create more interesting and relevant lessons for their students if they have a better grasp of cultural trends in things like student behaviour, preference, and difficulty. To further improve inclusion and learning outcomes, cultural analytics may provide light on how different cultural aspects impact students' communication patterns, learning styles, and relationships with one another.

**$H_{01}$: "There is no significant relationship between Cultural Analytics and Classroom Instruction"**

**$H_1$: "There is a significant relationship between Cultural Analytics and Classroom Instruction"**

**Table.2: ANOVA test ($H_1$)**

| ANOVA | | | | | |
|---|---|---|---|---|---|
| **Sum** | | | | | |
| | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| **Between Groups** | 39588.620 | 215 | 5655.517 | 611.212 | .000 |
| **Within Groups** | 492.770 | 533 | 5.356 | | |
| **Total** | 40081.390 | 748 | | | |

"In this study, the result is significant. The value of F is 611.212, which reaches significance with a p-value of .000 (which is less than the .05 alpha level). This means the ***$H_1$: "There is a significant relationship between Cultural Analytics and Classroom Instruction"*** is accepted and the null hypothesis is rejected."

## 8. DISCUSSION:

While the need for continuing education for technology and communication integration professionals is acknowledged and discussed in chapter two of this thesis, the specific choices that led to the creation of this program may not be immediately apparent. In order to gauge the culture of ICT integration in schools, the first step of the course is an instructor survey. School administration and teacher-leaders will convene after this poll to formulate a plan for integrating ICT. School leaders, educators, and others may benefit from taking this poll to better understand the ethos of the institution. If the implementer doesn't pay attention, the software might be set up to fail. If the school's culture isn't supportive of technology integration, individual educators may find it difficult to implement it. A first-order integration obstacle, according to researchers, is school culture. Two advantages result from

administrators and teachers collaborating on an ICT integration strategy for the whole school. Get the teachers on the steering committee started. Government support for initiatives to integrate ICT is also guaranteed. According to research Kwon et al., integrating ICT requires assistance from administrative personnel. Strong leadership is recommended by academics as a means to maintain successful integration of ICT (Kwon et al., 2020).

## 9. CONCLUSION:

The government is actively attempting to incorporate ICT into schools via a variety of initiatives and financing mechanisms. Many believe that preparing students for success in the contemporary world via the use of technology in the classroom is the way to go. Looking back at how ICT has been used in classrooms reveals a lack of adequate integration. Investments in ICT components are enhanced via innovation, collaborative learning, intervention, and inquiry-based learning, all of which promote the inclusion of ICT. A constructivist pedagogy is often believed to be the only method capable of achieving this goal. Constructivist pedagogy places an emphasis on student-centered, inquiry-based learning. Fostering critical thinking and cooperation is the goal of constructivist education. Students might gain from constructivism with the use of technology. No one has delivered on the promises made by academics, reformers, and integrationists about the use of ICT. It would seem that teachers would never master the art of incorporating technology into their lessons. Incorporating ICT into schools impacts several sectors, including science, administration, students, and instructors. Teachers are often expected to go above and above when it comes to incorporating technology into their lessons because of the importance of their work. Classroom activities are mostly influenced by instructors' ideas, attitudes, self-efficacy, creativity, and ability. The interaction of these characteristics with college, technical, administrative, and student factors presents each educator with an endless number of unique obstacles. In order for teachers to effectively use ICT, they need training, support, and incentives.

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