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Postsecondary Mathematics during the Covid-19 Pandemic: A Systematic Review

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Abstract- The Coronavirus 2019 pandemic has brought about the need for prompt and dynamic changes in the educational system, including the use of e-Learning. Mathematics is a particularly abstract field of study that may be difficult to teach through e-Learning. Psychosocial factors pandemic may further challenge educators and students in mathematics e-Learning during the pandemic. This systematic review aims to explore the transitional experiences of postsecondary educators and students in mathematics e-Learning during the Coronavirus 2019 pandemic. Nine articles met the criteria and were included for synthesis. Findings revealed that the most utilized and preferred technologies were Google Classroom, Moodle, and WhatsApp. Changes in educators' practices included increased hours spent on teaching preparation and tasks, reduced use of gestures, sending notes prior to lessons, and reduced student interactions. Advantages of mathematics e-Learning perceived by educators included improvements in student involvement, lesson planning, teaching style, and comfort in technologies. Major challenges perceived by educators were reduced student interactions, lack of special software for mathematics, difficulty monitoring student progress, and difficulty with testing.

Keywords: *covid-19, e-learning, higher education, mathematics, systematic review.*

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Keywords: covid-19, e-learning, higher education, mathematics, systematic review.

I. Introduction

The Coronavirus 2019 (Covid-19) pandemic, which began in December of 2019 in Wuhan, China, has had a significant impact on various fields across the globe, including the field of higher education (Marinoni et al., 2020). Based on the United Nations Educational, Scientific and Cultural Organization (UNESCO) reports, 185 nations declared closure of their educational institutions beginning April of 2020, thereby impeding on the education of around 1,542,412,000 learners (89.4% of overall enrolled learners) around the world (Marinoni et al., 2020). Such a large scale and dynamic change has never occurred before, and warranted extensive adjustments to educational systems (Cassibba et al., 2021). Since then, several learners and educators have experienced unforeseen radical reconstructions of education as they worked or studied from home (Neuwirth et al., 2020). Both learners and educators have had to adjust to the new system of e-Learning.

E-Learning has been defined as the use of various types of information and communications technologies (ICT), such as e-mail, software, and learning management systems (LMS), among others, for the purposes of education (Ayu, 2020). E-Learning is a part of the fourth industrial revolution (4IR), which involves the technological integration of the physical, biological, and digital aspects of life (Sakhapov & Absalyamova, 2018). Although the 4IR beganearlier than the Covid-19 pandemic, disparities in terms of readiness still exists between nations and between individuals (Naidoo, 2020; Sakhapov & Absalyamova, 2018). Furthermore, although individuals may be accustomed to using technologies for personal uses, e-Learning is substantially different (Nsengimana et al., 2021). The terms digital natives and digital immigrants illustrate the disparities in readiness (Naidoo, 2020). Digital natives are individuals who are well-versed in the use of latest technologies, while digital immigrants comprise those who are unfamiliar with technology and may tend to rely primarily on printed materials prior to using digital technology (Naidoo, 2020). With the sudden adjustments made due to Covid-19, digital immigrants may have difficulties transitioning to the digital lifestyle.

Other psychosocial factors may also be at play during the Covid-19 pandemic. Given the new virtual classroom environment and possible distractions in the physical environment, the learners may have difficulties focusing on their lessons or participating in discussions (Neuwirth et al., 2020). At the same time, educators may have trouble adjusting to teaching on a screen with minimal visual feedback from and engagement from their students (Neuwirth et al., 2020). In addition to these obstacles, Ludwig (2021) proposed the phenomenon of Covid despair, which describes negative psychological state of individuals during the pandemic. During this difficult time, individuals may struggle with financial stress, unemployment, cramped living spaces, lack of recreation, social isolation, and immediate deportation of international students. Given these difficulties, the present generation of young adults (Gen Z) were found

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to be the loneliest and most negatively affected generation in terms of mental health (Ludwig, 2021). Such psychosocial factors may serve as additional burdens that can impact the transitional experiences of both learners and educators to e-Learning during the Covid-19 pandemic.

Mathematics is a subject of particular interest for the topic of e-Learning. Cassibba et al. (2021) purported that mathematics was a highly abstract field of study that involved a great deal of cognitive metaphors so that learners could objectify and understand mathematical topics with what they already know. As such, the use of gestures and body language was purported to be useful in helping learners to visualize the mathematical objects (Cassibba et al., 2021).

Mathematics is also known for its use of specific language and symbols, which should be supported in e-Learning platforms (Ahn & Edwin, 2018). Additionally, mathematics may best be taught synchronously to allow for practice (Nsengimana et al., 2021). Collaboration was also cited as a valuable factor for mathematics education to allow learners to work together on solutions for mathematical problems (Naidoo, 2020). The aspects of practice and collaboration, however, may be more restricted in e-Learning (Naidoo, 2020; Nsengimana et al., 2021).

Although various software have been developed specifically for mathematics e-Learning, use of such software in practice remains scarce because of the difficulties in setting them up and using them, in addition to the high costs associated with them (Ahn & Edwin, 2018). Mathematics education may thus need considerable adjustment from traditional face-to-face learning to e- Learning. A synthesis of the evidence on the current state of postsecondary mathematics e-Learning may be valuable to determine possible gaps and challenges that could be addressed or improved upon for better transitional experiences of educators and students.

To address the issues presented regarding mathematics education in e-Learning during the Covid-19 pandemic, this systematic review involved the consolidation of the available data on educators' and learners' experiences. The main research question for this review is: What are the transitional experiences of postsecondary educators and students in mathematics e-Learning during the Covid-19 pandemic? This is divided further into four sub-research questions:

RQ1: Which technologies were frequently utilized for postsecondary mathematics e- Learning during the Covid-19 pandemic?

RQ2: What were the changes in educators' practices of teaching postsecondary mathematics during the Covid-19 pandemic?

RQ3: How did postsecondary educators perceive mathematics e-Learning during the Covid-19 pandemic?

RQ4: How did postsecondary students perceive mathematics e-Learning during the Covid-19 pandemic?

II. Method

Systematic reviews are used to collate evidence regarding specific questions with a search strategy that is explicit, systematic, and replicable (Gough et al., 2017). The use of clearly defined inclusion and exclusion criteria is vital for the search strategy. The resulting studies from the search are coded and synthesized to arrive at findings that address the research questions, highlight gaps and inconsistencies on existing evidence, and serve as potential guides for practice (Gough et al., 2017). For this systematic review, nine articles regarding the topic of transitional experiences in postsecondary mathematics e-Learning were mapped.

a) Search Strategy

The inclusion criteria for this systematic review were peer-reviewed studies that were published in the English language and involved postsecondary mathematics education during the Covid-19 pandemic, with the sample of postsecondary educators, students, or both. As the Covid-19 pandemic began in December of 2019, the search was limited to articles published in 2020 and 2021. Exclusion criteria were articles that had no full text available, not relevant to the topic, and those in the forms of systematic reviews, meta-analyses, letters to the Editor, commentaries, or theoretical articles. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021), a search was conducted on September 2021 using four databases: ERIC, Google Scholar, JSTOR, and MDPI, resulting in an initial number of 26,497 records identified (see Figure 1). Search terms utilized are also presented in Table 1.

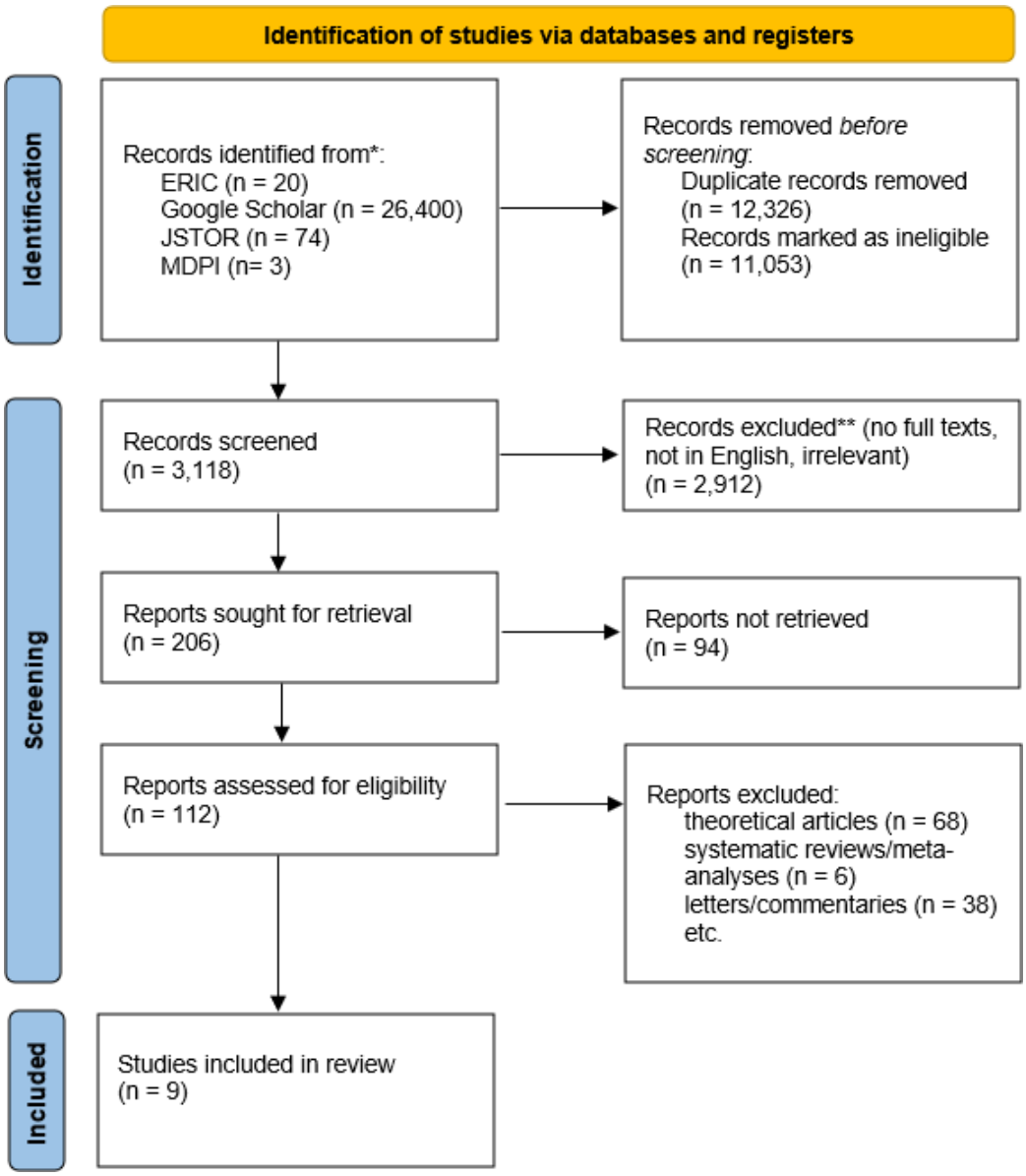

Figure 1: PRISMA diagram (slightly modified after Page et al., 2021)

Table 1: Search Terms Used

Topic	Search terms
Mathematics	"mathematics" OR "math"
Higher Education	"higher education" OR "tertiary education" OR "postsecondary education" OR "college" OR "university"
Coronavirus	"Coronavirus" OR "Covid" OR "Covid-19" OR "SARS-CoV 2"
e-Learning	"e-Learning" OR "distance learning" OR "distance education" OR "online learning" OR "online education" OR "virtual learning" OR "virtual education"

The titles and abstracts of the initial records were screened. Upon removal of duplicate records, 14,171 records remained. Further removal of ineligible records resulted in 3,118 remaining records. Of these records, 2,912 were removed based on the exclusion criteria, and 94 were unavailable for retrieval. The remaining 112 were thoroughly assessed based on the inclusion criteria, and 103 were removed. This process resulted in a total of nine records included in this systematic review.

b) Coding, Data extraction, and Analysis

To extract the data from the studies, a coding process was developed, which included article information (method, sample, and countries of

authorship). Study results were also coded based on their relationship with the sub-research questions, which included the technologies used for mathematics e-Learning, changes in practices, educators' perceptions, and students' perceptions. The coding, extraction, and analysis processes were conducted with the NVivo software version 12. Because most of the studies were qualitative in nature, meta-analysis could not be conducted. It should be noted that percentages from the analyses may not amount to 100%due to rounding.

III. Study Characteristics

a) Methodological Characteristics

Among the nine studies included in this review, five studies (55.6%) used qualitative methods, two studies (22.2%) used quantitative methods, and two studies (22.2%) used mixed methods. Although the majority of the studies were qualitative, only two out of the nine studies (22.2%) were interpretive in nature, with the rest being descriptive. Almost all studies involved an online survey with the exception of Naidoo (2020), who utilized online workshops and online discussion forums, and Siregar et al. (2021), who utilized observations, interviews, and other files in their study.

Various types of analyses were used in the qualitative studies, including content analysis (Nsengimana et al., 2021), open coding (Naidoo, 2020), and the Miles and Huberman procedure(Sulistyani et al., 2021), while the others did not specify the type of analysis used. Both of the quantitative studies involved descriptive statistics, and did not specify the instrument used for analysis. No correlations or causations were established in the quantitative studies. The mixed methods studies employed more sophisticated processes of analysis including McNemar's tests, Chi-square tests, Kruskal-Wallis tests, and thematic analyses. Significant correlations were established in Lopez et al.'s (2021) study regarding self-reported additional hours spent teaching and increase in technologies during the transition to e-Learning. Cassibba et al. (2021) likewise reported significant increases in technologies used, as well as significant differences in willingness to continue e-Learning based on professors' age.

b) Geographical Characteristics

The studies included in this systematic review encompassed six nations. Three studies (33.3%) took place in Indonesia, two (22.2%) in the United States, and one study (11.1%) each for Italy, Rwanda, South Africa, and Ghana. Interestingly, the locations for the studies were mostly clustered around the continent of Africa and the nation of Indonesia. Although Africa has been known to be significantly affected in past pandemics, the Ghanaian and Rwandan governments imposed restrictions promptly, allowing for minimal cases in their respective nations (Attiah, 2020). Contrastingly, South Africa experienced a swift rise in Covid-19 cases early in March 2020 before imposing restrictions (Stiegler & Bouchard, 2020). As such, the findings of the three African studies are reflective of diverse situations albeit being within the same continent. It should also be noted that internet usage is highly limited in Africa, with only 24% of the population having access due to increased costs and poor connectivity, which could be a factor for e-Learning (Tamrat & Teferra, 2020).

Indonesia, the nation with the greatest number of studies in this systematic review, was affected by Covid-19 early on as well. Reports from June 2020 indicated that Indonesia had the highest number of active cases in Southeast Asia, but at the same time, the lowest number of infection per capita (Olivia et al., 2020). The rise in the number of cases was attributed to the slow response of the Indonesian government when its neighboring countries were already imposing lockdowns (Olivia et al., 2020). Notably, Indonesia was reportedly unprepared for e- Learning as well, with only nine universities having established systems for e-Learning before the pandemic (Siregar et al., 2021). The three Indonesian studies in this review took place in different cities. It should be noted that all Indonesian studies in this systematic review utilized purely qualitative methods, which does not allow for a generalizable view of the nation.

Although two studies took place in the United States, the data was still limited as Ludwig's (2021) sample comprised students from a single university in western United States, while Lopez et al.'s (2021) sample only included educators from four higher education institutions in South and Central Texas. Only one study was found in Europe. The single European study was conducted in Italy, a nation that also saw a steep rise of Covid-19 cases early in March 2020, and adopted strict measures to contain the outbreak (Saglietto et al., 2020). Although the use of technologies in higher education was not new to Italy at the time of the Covid-19 outbreak, several traditional universities that used blackboard and chalk still existed (Cassibba et al., 2021). No studies that met the criteria were found in South America and Australia.

c) Sample Characteristics

The criteria for the study samples in this systematic review included either educators or students in the postsecondary levels. Five studies (55.6%) involved educators, two studies (22.2%) involved undergraduate students, and two studies (22.2%) involved postgraduate students. Notably, the two studies involving postgraduate students both took place in Africa. All three Indonesian studies involved lecturers. Although the North American studies in this review took place in different states of the United States, it is the only continent with a study on educators and on students.

For the qualitative studies, sample sizes were mostly between 14 to 31, with the exception of Siregar et al. (2021), whose sample included 200 lecturers; however, it should be noted that these 200 lecturers were from a single university, thus also limiting the generalizability of their results. The two quantitative studies had 120 and 467 undergraduate students for their samples, while the mixed methods studies had 27 and 51 professors for their samples. These could be somewhat proportional to the study populations, as the undergraduate student population generally outnumbers the population of educators and postgraduate students.

IV. Results

RQ1: Which technologies were frequently utilized for postsecondary mathematics e-Learningduring the Covid-19 pandemic?

Seven studies (77.8%) reported on the technologies frequently used for e-Learning during the Covid-19 pandemic (see Table 2). The studies addressing this sub-research question comprised one (14.3%) quantitative, two (28.6%) mixed methods, and four (57.1%) qualitative studies. All studies indicated platforms used or preferred by educators or students. Only one study (Agormedah et al., 2020) reported on the devices used, or lack thereof, for e-Learning, as well as self-reported proficiency for such devices. This unique finding highlighted the challengeof access to technology for e-Learning in Ghana (Agormedah et al., 2020).

Qualitative data regarding the challenges associated with technologies used were presented in three studies (33.3%). Two of these studies indicated lack of training and preparation as major challenges (Lopez et al., 2021; Naidoo, 2020), while specific programs were cited by Irfan et al. (2020) and Naidoo (2020). Notably, Siregar et al. (2021) were the only ones to report on an additional factor of generational differences in terms of technologies used for e-Learning, noting how millennials born between 1981 to 1994 were more likely to combine group chat and LMS platforms while baby boomers born between 1946 to 1964 were more likelyto use only group chat platforms.

Preferences for and uses of LMS platforms appeared to vary between studies; however, the most frequently cited in this review were Google Classroom (3/7, 42.9%) and Moodle (3/7, 42.9%). Based on the studies in this systematic review, Google Classroom appeared to be more popular in Indonesia, while it was only ranked third in Ghana in terms of student awareness (Agormedah et al., 2020; Irfan et al., 2020; Sulistyani et al., 2021). Moodle was ranked second in terms of Ghanaian student awareness (Agormedah et al., 2020); however, South African students in Naidoo's (2020) study reported feeling uncomfortable with Moodle, and indicated that response times were too long with Moodle.

In terms of communication platforms, WhatsApp appeared to be the most popular in general, as it was specifically cited in four out of seven (57.1%) of the studies. Notably, WhatsApp was the most preferred or most used communications platform in all of these studies.Only educators (37%) in Cassibba et al.'s (2021) study in Italy reported using mathematical software for e-Learning, and only one educator (7.1%) in Sulistyani et al.'s (2021) study in Indonesia reported using an evaluation software out of the seven studies. Although 75% of Lopez et al.'s (2021) participant educators reported giving online quizzes, they did not specify whether these were conducted using an evaluation software.

Table 2: Technologies Used for e-Learning

Author (Year)	Method	Sample	Location	Results
Agormedah et al. (2020)	Quantitative survey	467 under- graduate students	Cape Coast, Ghana	Awareness of platforms: Alison (202/467, 43.3%); Moodle (132/467, 28.3%); Google Classroom (125/467, 26.8%) Preference for e-Learning: WhatsApp (236/467, 50.5%); Google Meeting (85/467, 18.2%); Zoom (82/267, 17.6%) Devices used for e-Learning: smartphones (358/467, 76.7%); laptops (40/467, 8.6%); no device (62/467, 13.3%) Device proficiency for e-Learning: smartphones (186/467, 39.8%); laptops (161/467, 34.5%); uncertain (106/467, 22.7%)
Cassibba et al. (2021)	Mixed Methods survey	27 educators	Sicily, Italy	Most frequently used: Microsoft teams (100%); writing tablets (61%); mathematical software (e.g. Mathematica; 37%)
Irfan et al. (2020)	Qualitative survey	26 educators	Sumatra, Java, Kaliman-tan, and Sulawesi, Indonesia	Most used platforms: Google Classroom (32%); Zoom (24%); Edmodo (24%); Skype (8%); university LMS (8%) Challenges reported: animation, object-oriented programming (Adobe Flash and web design), and video editing

Lopez et al. (2021)	Mixed methods survey	51 educators	Texas, U.S.	Added technologies during the Covid-19 pandemic: video platforms (e.g. Zoom, 92%); online quizzes (75%); instructional videos (57%); social media communications (27%) Challenges reported: lack of preparation andtraining
Naidoo (2020)	Qualitative inter-pretivist	31 post-graduate students	KwaZulu-Natal, South Africa	Preferred platform: WhatsApp for immediatefeedback and easy resource sharing Challenges reported: lack of training and adjustments to Zoom; uncomfortable with Moodle
Siregar et al. (2021)	Qualitative descriptive	200 educators	Medan, Indonesia	Most used: WhatsApp (92/200, 46%) Generational differences: Millennials (born 1981-1994) most frequently combined group chat platforms and LMS; Baby Boomers (born 1946-1964) mostly used group chat platforms
Sulistyani etal. (2021)	Qualitative descriptive	14 educators	Yogyakarta, Indonesia	Most used: social media (WhatsApp or LINE, 11/14, 78.6%); asynchronous videos (11/14, 78.6%); LMS (Moodle or Google Classroom, 10/14, 71.4%); text files (PDF, Word, PowerPoint,9/14, 64.3%); synchronous videos (Zoom, MS Teams, or Skype, 6/14, 42.9%); evaluation software (Quizizz, 1/14, 7.1%)

RQ2: What were the changes in educators' practices of teaching postsecondary mathematics during the Covid-19 pandemic?

Changes in educators' practices were reported in only three (33.3%) studies (see Table 3). These studies comprised one (33.3%) qualitative study and two (66.7%) mixed methods studies from different geographical locations. Samples were all educators and the sample sizes ranged from 14 to 51. None of the educators in Cassibba et al.'s (2021) study in Italy had prior experiences with lecturing online before the Covid-19 pandemic. Among educators from Texas in Lopez et al.'s (2021) study, 23% were certified for e-Learning, 6% had received some trainingon e-Learning, and 29% had prior experiences teaching online or blended courses. Sulistyani et al. (2021) did not explicitly report on the prior experiences of their participants in teaching with e-Learning.

The findings of the three studies under this sub-research question were varied. A majority of educators (78.6%) in Sulistyani et al.'s (2021) study in Indonesia stated that they were able to successfully achieve educational goals without modifying their teaching practices or strategies in e-Learning, and only 14.3% reported modifications in teaching practices or strategies. These results are somewhat contrary to the changes reported in Cassibba et al.'s (2021) and Lopez et al.'s (2021) studies. Educators in Cassibba et al.'s study in Italy stated that they had to increase their preparation for e-Learning, used less gestures, and were able to do more with their lessons given the same amount of time because they sent notes prior to each lesson; however, the faster pace was also attributed to the decrease in student interactions. A majority (64%) of Cassibba et al.'s participants, independent of their number of students, had difficulty perceiving whether their students kept up with their lessons. Those who were able to perceive their students' ability to keep up with the lessons mostly had to ask students directly (30%). Notably, practices in terms of language and representations used were mostly retained (Cassibba et al., 2021). In Lopez et al.'s (2021) study in Texas, the changes reported were significant increases in time spent on teaching tasks and on technology usage.

Table 3: Changes in Educators' Practices

Author (Year)	Method	Sample	Location	Results
Cassibba et al. (2021)	Mixed methods survey	27 educators	Sicily, Italy	Changes with e-Learning: increased preparation; less gestures; pre-sent notes; lack of student interaction; unable to perceive whether students kept up with lessons Retained: use of natural language, mathematicallanguage, and iconic representations
Lopez et al. (2021)	Mixed methods survey	51 educators	Texas, U.S.	Hours increased: educators with one or two courses from 11.4 to 17.3 hours per week (52% increase); educators with three or more courses from 28.5 to 38.9 hours per week (36% increase) Technology usage: youngest group (aged 24 to 39 years) from 2.8 to 5.5 (96% increase); middle group (aged 40 to 54 years) from 3 to 5.6 (87% increase); oldest group (aged 55 years and above) from 3 to 5 (67% increase), all significantat ($p < 0.0001$)

Sulistyani et al. (2021)	Qualitative descriptive	14 educators	Yogyakarta, Indonesia	11/14 (78.6%) of educators indicated successful achievement of educational goals without modification upon shifting to e-Learning; 2/14(14.3%) of educators indicated success withunspecified modifications

RQ3: How did postsecondary educators perceive mathematics e-Learning during the Covid-19pandemic?

Four out of the nine studies (44.4%) in this systematic review reported on educators' perceptions regrading mathematics e-Learning (see Table 4). These studies included two (50%) qualitative and two (50%) mixed methods studies. Two studies (50%) took place in Indonesia, one (25%) in Italy, and one (25%) in Texas, United States. Sample sizes varied from 14 to 51.

Educators' perceptions regarding mathematics e-Learning mostly involved challenges invarious aspects of e-Learning with a few advantages. Only Irfan et al. (2020) did not report any perceived advantages of mathematics e-Learning. The main advantages identified were improved student involvement (Cassibba et al., 2021; Sulistyani et al., 2021), improved lesson planning (Cassibba et al., 2021), and improved teaching style as well as comfort with technologies (Lopez et al., 2021). More challenges were identified within the studies, as listed in Table 4. Notably, Lopez et al. (2021) reported a significant increase in educators' willingness to teach online.

Table 4: Educators' Perceptions of Mathematics e-Learning

Author (Year)	Method	Sample	Location	Results
Cassibba etal. (2021)	Mixed methods survey	27 educators	Sicily, Italy	Advantages of e-Learning: improved student involvement because of increased student responsibility; improved lesson planning Challenges: loss of human exchange (43%); loss of student interactions (27%)
Irfan et al. (2020)	Qualitative survey	26 educators	Sumatra, Java, Kaliman-tan, and Sulawesi, Indonesia	Challenges: limited delivery methods becauseof lack of special software for mathematics; difficulty monitoring students' struggles
Lopez et al. (2021)	Mixed methods survey	51 educators	Texas, U.S.	Advantages: increased comfort level with technologies (69%); improved teaching style (55%) Top Challenges (out of 102 points): testing (83); encouraging student interactions with each other (81) Medium Level Challenges: professor-student interactions (66); absenteeism (63); personal teaching styles (61); student connectivity (58); work-life balance (53); time management (48); remote office hours (44) Low Level Challenges: whiteboard use (39); homework (38); educator connectivity (32); LMS (16) Willingness to teach online: significant increase from 5 (10%) to 19 (37%) educators ($p < 0.0005$)
Sulistyani et al. (2021)	Qualitative descriptive	14 educators	Yogyakarta, Indonesia	Advantages: student involvement in learning (92.9%); student involvement in discussions (78.6%) Future Improvements for e-Learning: increased preparation in terms of content and time (71.4%); more varied technology use (50%); more innovative and communicative delivery methods (50%); outcome-based learning adjustments (28.6%); continued focus on deepening student experience (7.1%)

RQ4: How did postsecondary students perceive mathematics e-Learning during the Covid-19pandemic?

Four out of the nine studies (44.4%) in this systematic review addressed this sub-research question regarding students' perceptions of mathematics e-Learning (see Table 5). Three of the studies (75%) were conducted in Africa, while one study (25%) was conducted in Western United States. Two quantitative studies (50%) involved undergraduate students, and two qualitative studies (50%) involved post-graduate students. Sample sizes varied from 20 to 467.

Qualitative findings highlighted both advantages and challenges with mathematics e-Learning. The main advantages perceived by post-graduate students included the ability to revisit lessons, having virtual communities of practice, development of technological skills, improvements in technical problem solving skills, and enhanced communication and

research skills (Naidoo, 2020; Nsengimana et al., 2021). The main challenges perceived by post-graduate students included increased costs, lack of internet access, lack of practical and hands-on activities, unclear instructions, limited collaboration, lack of ICT knowledge, insufficient feedback, and distractions and responsibilities at home (Naidoo, 2020; Nsengimana et al., 2021).

Quantitative data for this sub-research question involved the challenges with mathematics e-Learning. The main challenges perceived by undergraduate students were mostly similar to those perceived by post-graduate students with the addition of feeling unprepared for e-Learning, increased anxiety about mathematics e-Learning, and the negative effects of Covid-19 on their mathematics learning abilities (Agormedah et al., 2020; Ludwig, 2021). An interesting, albeit non-significant finding by Ludwig (2021) was that students with high anxiety, strong negative perceptions about the effect of Covid-19 on their mathematics learning abilities, and neutral perceptions of e-Learning had the lowest midterm scores averaging at 80 points, which was one standard deviation below average. No advantages of mathematics e-Learning were reported in the quantitative studies; however, this may be due to the rigid nature of the instruments used rather than the lack of advantages per se. In Agormedah et al.'s (2020) study in Ghana, a majority (56.7%) of students considered e-Learning to be necessary.

Table 5: Students' Perceptions of Mathematics E-Learning

Author (Year)	Method	Sample	Location	Results
Agormedah et al. (2020)	Quantitative survey	467 under-graduate students	Cape Coast, Ghana	Challenges: access to continuous internet connection (55.5% had no access, 29.8% were unsure); finances for internet data (67.9% could not afford enough data, 23,1% were unsure); unfamiliarity with e- Learning (86.7% were unfamiliar, 91.9% used e- Learning for the first time); preparation for e- Learning (47.5% felt unprepared, 19.9% were unsure) Perception of e-Learning: 56.7% considered it necessary, 43.3% did not consider it necessary
Ludwig (2021)	Quantitative survey	120 under-graduate students	Western United States	Challenges: anxiety about mathematics e-Learning (mean 6.3/10); Covid-19 effects on mathematics learning ability (mean 4/10) Perception of e-Learning: neutral (mean 4.7/10) Non-significant Correlations: students with high anxiety levels scored 6.2 points (0.4 standard deviations) below average in midterm exams (not significant); students with high anxiety, strong negative perceptions about Covid-19 effects on mathematics learning ability, and neutral perception of e-Learning scored lowest in midterm exams (80 points, 1 standard deviation below average, not significant)
Naidoo (2020)	Qualitative inter-pretivist	31 post-graduate students	KwaZulu-Natal, South Africa	Advantages: ability to revisit lessons with asynchronous recordings and resources; creation of virtual communities of practice for collaboration and online social support Challenges: device, data, and resource costs; family responsibilities and distractions at home
Nsengimana et al. (2021)	Qualitative inter-pretivist	20 post-graduate students	Kigali, Rwanda	Advantages: improved technological skills; improved technical problem solving; enhanced communication and research skills Challenges: lack of internet access; lack of practical works or simulations; unclear instructions for online exercises; limited collaboration; lack of resources; lack of hands-on activities; lack of access to laboratories and field trips; lack of knowledge on ICT tools; insufficient feedback; distractions at home

V. Discussion

The findings of this systematic review involved the transitional experiences of postsecondary educators and students regarding mathematics e-Learning during the Covid-19 pandemic in six different countries. The narrow focus on mathematics and the period of the Covid-19 pandemic allowed for a specialized overview of this field during this challenging period, hence the limited number of studies included in the review. The studies were further clustered around certain geographic locations including Indonesia, the United States, and African countries. Nonetheless, the findings from these studies provided a general overview of the technologies used, changes in practices, and perceptions of postsecondary educators and students regarding mathematics e-Learning.

The findings regarding technologies used for e-Learning during the Covid-19 pandemic highlighted the variability in available technologies for communications and LMS; however, the most prevalent were Google classroom, Moodle, and WhatsApp (Agormedah et al., 2020; Irfan et al., 2020; Naidoo, 2020; Siregar et al., 2021; Sulistyani et al., 2021). It appears that few educators utilized more specialized technologies such as evaluation software or mathematical software. Some educators in Irfan et al.'s (2020) study stated that they wished there were available systems for attendance and assessment, which reflected a lack of awareness regarding such software. Such findings supported the idea that even digital natives may be unprepared for e-Learning as they may only be familiar with technologies for personal use rather than for e-Learning (Nsengimana et al., 2021). These findings also supported Ahn and Edwin's (2018) idea that specialized software use remains scarce due to difficulties in setup and high costs. As institutions and educators continue to adjust towards e-Learning, it may be helpful to develop more user-friendly and universal software that they could use, and to raise awareness regardingthese technologies.

In terms of the changes in educators' practices for e-Learning, the main issue appeared to be the increased preparation required for teaching tasks (Cassibba et al., 2021; Lopez et al., 2021). Only Cassibba et al. (2021) reported the use of less gestures, which was purported to be a vital part of mathematics education. The increase in use of technologies reported by Lopez et al. (2021) was unsurprising as it is the main principle of e-Learning (Ayu, 2020). No other major changes in practice and strategies were reported. The finding that a majority of educators in Sulistyani et al.'s (2021) study were able to successfully achieve their goals without major changes shows some promise for the use of e-Learning in mathematics. Cassibba et al.'s (2021) participants likewise indicated that they retained the use of natural language, mathematical language, and iconic representations, which is important for the subject of mathematics (Ahn & Edwin, 2018). Although the minimal changes found in this review is promising, educators shouldalso find ways to maximize the benefits of technologies and apply positive changes to their practices and strategies.

Postsecondary educators' perceptions regarding mathematics e-Learning were somewhat mixed, with more challenges reported than benefits. The loss of student interactions and involvement in lessons and discussions appeared to be a major challenge for educators (Cassibba et al., 2021; Irfan et al., 2020; Sulistyani et al., 2021). This challenge supported Neuwirth et al.'s (2020) idea that teaching on a screen with minimal visual feedback can serve as a barrier for student engagement. This challenge also limits the opportunities for student collaboration, which was cited as an important factor for mathematics education (Naidoo, 2020; Nsengimana et al., 2021). Alternatively, the main advantage of e-Learning appeared to be the improvements in student involvement because of their increased responsibilities (Cassibba et al., 2021; Sulistyani et al., 2021). The increase in student responsibilities, however, may be counterproductive for students who are experiencing Covid despair (Ludwig, 2021). As educators in Lopez et al.'s (2021) study indicated work-life balance as a medium-level challenge for them, educators should also consider the needs of their students during this difficult period.

Relatively more challenges with mathematics e-Learning were reported by students, while only two studies reported on benefits. The advantage of increased technological, problem solving, communication, and research skills (Nsengimana et al., 2021) support the idea that students can adjust and progress from digital immigrants to digital natives (Naidoo, 2020).

Interestingly, a key advantage identified in Naidoo's (2020) study was the creation of virtual communities, which could be a solution to the educators' perceived challenge of loss of student interactions and collaboration (Cassibba et al., 2021; Lopez et al., 2021; Sulistyani et al., 2021). The challenges identified by the postsecondary students supported existing literature indicating lack of readiness for e-Learning (Sakhapov & Absalyamova, 2018), possible distractions at home, and other psychosocial factors (Neuwirth et al. 2020). The challenge of family responsibilities may be especially pronounced for postsecondary students who have children (Naidoo, 2020). Students should thus be given more time to adjust and training in preparation fore-Learning. Overall, mathematics e-Learning may be necessary for the time being and may have benefits, but the multiple challenges identified in this review indicate a need to further develop the field.

VI. Limitations

A major limitation for this systematic review is the small number of studies that met the criteria. Although this limitation could not be controlled due to the narrow focus of the review, it limits the opportunities for comparison and synthesis. Additional research is needed to provide a more solid evidence regarding the transitional experiences of postsecondary educators and students for mathematics e-Learning during the Covid-19 pandemic. Notable geographical limitations were also found in this systematic review, with most studies clustering in Africa and Indonesia. Similar studies in other nations, especially in South America and Australia would be particularly helpful in providing a more diverse and global view of the field. More quantitative evidence with larger sample sizes would also be beneficial to obtain a more holistic overview of

the transitional experiences of educators and students regarding postsecondary mathematics e-Learning during the Covid-19 pandemic.

Availability of Data and Materials

The dataset for this article were derived from peer-reviewed scientific publications, which are listed as references.

Competing Interests

The author declares that they have no competing interests

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VII. List of Abbreviations

4IR	Fourth Industrial Revolution
Covid-19	Coronavirus 2019
ICT	Information and Communications Technologies
LMS	Learning Management Systems
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Conceptions about Teaching DNA in Basic Education: A Reading based on Henri Atlan

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Abstract- This article aims to analyze the conceptions about the teaching of DNA present in the discourse of high school biology teachers and in the Biology Textbooks (BT) of the last National Textbook Plan (PNLD), according to the conceptions of Henri Atlan. The qualitative research used a questionnaire for teachers in the area, and also Biology textbooks for data collection and analysis, in order to answer the following problem situation: What are the concepts of DNA used by teachers and also reinforced by LD for and in Biology teaching ? The data reveal that teachers work with conceptions of DNA teaching as a program the computer, and this concept is also used in Biology textbooks, which presupposes articulating more appropriate terminologies for teaching this molecule due to current studies on epigenetics, in which the complexity of possible combinations of DNA lead to complex and integrative biochemical production. DNA (desoxirribonucleic acid) should be considered a set of complex data, rather than a single and linear program, addressed in the speeches of teachers in the classroom as well as in the adopted textbooks, in a complex notion proposed by Henri Atlan.

Keywords: DNA; PNLD; biology teaching and learning; epigenetics.

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I. Introduction

Henri Atlan, French physician, biophysicist and philosopher, was born in 1931 in Algeria. Gathering knowledge in the area of biology, physics and computing, he presents in his research the complexity of knowledge between the natural sciences and the human sciences, starting to describe from ontology and epistemology in an anthropological approach to the direct link between these sciences.

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Based on the great discoveries occurred between the decades of 1960 and 1970 in molecular biology, Henri Atlan develops his theory of "complexity from noise" (ATLAN, 1992). Although some aspects have been clarified regarding the structure of DNA, its role in human reproduction, its duplication, the transmission of information to new generations within the cells and that genes are DNA molecules, Atlan has since attributed misconceptions to the design of the gene. For the author, considering DNA as a "genetic program" is just a mistaken metaphor (ATLAN, 2003). In this aspect, it is based on models from physics and chemistry for its concept of self-organization, in order to show that the genetic code is a projection of the linear structures of DNA, for those of proteins, that is, a coding, that is not to be confused with a program (idem, 2003).

In face of this, we can refer to the knowledge systematized in basic education. How do Biology teachers articulate knowledge about DNA at school? And, how do school textbooks systematize such knowledge? Does the conception of DNA by the teachers and the one present in the textbooks characterize it as data or a program? How would it be possible, by mediating knowledge about DNA at school, to present teachers with a more complex and integrative terminology? And could the teaching materials have a more integrative organization regarding the approach to teaching DNA?

Thus, analyzing the teaching conception that basic education teachers articulate at school, as well as the textbooks of the last PNLD used in teaching Biology, from the perspective of Henri Atlan, may open up new fields of problematization. Such problematizations occur in the sense of pointing out the current condition of the appropriation of school knowledge, as well as new terminologies that enable conceptual approaches for and in the teaching of Biology, in a more integrative and complex way of knowledge, according to Morin (2013).

II. Henri Atlan's Epigenetics for Biology Teaching and Learning

The knowledge taught at school and present in the school curriculum and in the textbooks of basic education articulate conceptions which, many times, it is necessary to problematize them. Narrowing the channel between the school field and the knowledge articulated

in the academy allows the student to learn recent conceptions that may contribute to or modify knowledge based on the school curriculum. In this aspect, the pedagogical practice can present itself as a response to scientific conceptions, connected to current paradigms.

Therefore, the genetic paradigm can be placed at the center of controversies. Genetics, as part of the biology occupies in understanding the mechanisms and laws that account for the transmission of the characteristics of living things through the generations.

The genesis of genetics in modern science stems from the studies of the Austrian Gregor Mendel, around 1860. And, with scientific and technological advances, genetics encompasses studies both in the area of Cell Biology and Molecular Biology, which comprises acid molecules deoxyribonucleic (DNA) and structural part of chromosomes, where genes are found, as responsible for information for protein synthesis.

Regarding the study of the functioning of genes in cell nuclei, in 1940, the English biologist Conrad Hal Waddington (1905-1975), presented the concept of epigenetics in his book Organizers and genes (SANTOS, 2015). Epigenetics is a metaphor used to explain the different processes that a cell undergoes in its gene activity in embryonic development and in each cell division.

It is worth noting that the origin of the term "epigenetics" occurred to Aristotle, from their empirical observations on the embryonic development of animals, to refer to the origin of a living being. Such a conception, called vitalist, was accepted until the 18th century. However, it was from the studies of Descartes and Isaac Newton that they started to adopt a material explanation for the origin of a living being linked to organic molecules. (CANGUILHEM, et al, 2003)

The understanding of how, in fact, the representation of complex order characteristics in living organisms is characterized, according to Oliveira and Muller (2015), as a third historical moment in twentieth-century biology. For these authors, at first, Biology was strongly influenced by creationist ideas, even with the advent of the Theory of Evolution; in a second moment, by Newton's mechanistic ideas and, in a third moment, when other theorists, including Henri Atlan, propose the theory of complexity for a broader approach to biological knowledge.

As Henri Atlan (2013) emphasizes, epigenetic mechanisms act to change the way in which the accessibility of chromatin for transcriptional regulation in the modification of DNA and nucleosomes occurs. Such mechanisms are essential for cell development. In addition, gene regulation is influenced by the environment and modifies over time, as shown by current studies and performed in the field of epigenetics. According to Silva and Duarte (2016, p. 438-439):

> Epigenetic mutations occur quite differently from genetic mutations. They are the product of the silencing or activation of a gene and not the change in the order of nitrogenous bases; they just turn genes on and off. Furthermore, epigenetic mutations are always targeted, responding to environmental changes. Some forms of epigenetic mutation can pass on to offspring, functioning as a genetic mutation; but, unlike the latter, they can be reversible.

Thus, this very current epigenetic concept modifies some bases of molecular biology in its central dogma: DNA - RNA - protein, seen in a linear fashion, since different DNA fragments, in combination with others, can generate different proteins in the organism, considering the exons, the introns and the biological phenomenon called splicing. This new fact for Biology has led to genetic research, opposing the idea of linearity of the DNA molecule and, at the same time, demonstrating a character of complexity, fundamental in the teaching of science in the 21st century (MORIN, 2006).

DNA is a polynucleotide that is found with four different species of nucleotides, different from each other by their nitrogen base. Such bases are: adenine (A), thymine (T), guanine (G) and cytosine (C). It is from the structure of the concept of DNA that Atlan (2006) attributes the “Information Theory” in order to present the implications involved in the study of the gene. So, a DNA molecule is made up of thousands of nucleotides, which are organized like written messages of four symbols. Still, following the same criteria, a protein is a polymer made up of millions of amino acids. There are 20 (twenty) different amino acids. So, a protein organizes itself as messages written in 20 (twenty) symbols. This means that “there is a univocal correspondence between the structure of a DNA molecule, determined by the sequence of its bases, and that of a protein, determined by the sequence of its amino acids” (ATLAN, 2006, p. 122).

Under the focus that the amino acid sequence is encoded in the DNA base sequence, effecting the protein synthesis, Atlan (2006) problematizes two aspects: one refers to the coding of messages in an alphabet of 20 (twenty) symbols, in messages with an alphabet of 4 (four) symbols, and another in relation to the coding methods carried out in nature, if they are really the same in all living organisms. In this respect, he claims that the coding is really the same in all organisms, which evidences, according to him, what we call the genetic code, since it constitutes a coding method common to all organisms. However, the author emphasizes that encoding should not be confused with programming (ATLAN, 2013).

It was in the 1960s that Molecular Biology made great discoveries and started to adopt the metaphors commonly known in the field of “information” and “cybernetics”. Studies on the DNA start to present concepts from the structure of DNA findings; its role in reproduction; those genes are DNA molecules and their duplication and transmission of information both within

cells and to new generations. Given this organization and the fact that the molecules (DNA and proteins) would be endowed with information, their functioning was compared to a computer. So, the DNA would be the program and, from then on, it would be adopted as a "genetic program". Atlan, at the time, attributed the programming analogy to DNA as a metaphor. According to the author "[...] to a very loose metaphor. In fact, when we look at DNA, we don't find any sign of computer language" (ATLAN, 2013, p. 125).

For Henri Atlan, self-organized systems describe the properties and capacities of living organisms to self-organize, thus providing a basis for situations in which living beings self-organize, based on models from Physics and Chemistry. Atlan (2013) was concerned with showing the organization of matter, with some degree of randomness, that is, a source of errors in transmission, which he called noise.

For Atlan, the fact that they consider DNA as a computer program is based on the following attributes:

> [...] DNA is a quaternary script easily reducible to a binary sequence; every sequential deterministic computer program is reducible to a binary sequence; the genetic determinations produced by the structure of the DNA work like a sequential program written in the DNA of genes (ATLAN, 2013, p. 159).

According to the author, the concept of DNA is summarized as a program, without even placing a random sequence at the center of the controversies. Furthermore, a binary sequence is not just a program in the DNA (ATLAN, 2006).

According to Atlan (2013), making the distinction between DNA as a "program" and DNA as a "data set" is to consider the implications involved in the role of the DNA nucleic sequence itself, that is, in the genetic determinations under the form of an alternative, between a program function and a data function. For him, this alternative allows us to question the role of the set of cells when always associated with DNA in the production of such determinations.

The classical notion of genetic program for DNA had, in its time, the heuristic and operational merit according to Henri Atlan (2003, 2006 and 2013). However, it points to situations that lead to the decline of scientific research when considering DNA from a metaphor, governed by unknown mechanisms, at the expense of explicitly knowing such devices. Therefore, it bases the conception of DNA as data, starting from the elements of the Information Theory area from the conceptions of the American Claude Shannon (1916-2001).

Shannon attributes entropy as a way to quantify the degree of uncertainty of a source of information, that is, it makes it possible to quantify the degree of complexity of a data set. "I used Shannon's information theory to formalize noise effects, that is, different factors of random aggression to organized systems" (ATLAN, 2006, p. 15). Using Shannon's formula, it is possible to explain how the amount of information occurs in living organisms and to quantify the complexity of biological systems. The formula shows itself by a function:

$$H(x) = -\sum_{i} p\ (i)\ log_2 p\ (i) \qquad (1)$$

In the formula, the amount of information in a message is represented by (x); (i) represents the index of symbols (x) used in the message (x_1, x_2, x_3, x_4, ... x_i., ..., x_N); p(i) represents the probability of the symbol x_i.;

As a result of experience by the formula [1] Shannon a message is sent through signs or symbols for the recipient to reconstruct the results that arrive to them. This means that there must be a code that allows extracting the result that is transmitted with the symbols of that message. Furthermore, the probabilities of the symbols of a message are independent, that is, the result of an experience does not influence the previous experience (ATLAN, 2006). Atlan justifies from [1] nuances to support his conception of DNA as data and not as a program.

Although the notion of noise for the Communication Theory is undesirable, for natural systems through the occurrence of noise (natural and social elements, among others), there are alternatives in communication, which leads to new forms of organization and survival. Such aspect makes any natural system complex (ATLAN, 2013).

In considering the analogy of the computer program, when referring to DNA, presupposes that it would be enough to wait for it to be executed, step-by-step, successively, in a respective time interval, until completing a cycle. In the case of an embryo, for example, it would develop as such program starts to be executed. What is necessary, according to Henri Atlan, is to understand "[...] how matter can itself change its form and activities, depending on its own history" (ATLAN, 2003, p. 127). For the author, the metaphor of the genetic program allows for mistakes inasmuch as the meanings are hidden from the adopted information. It is like a habit, in which the problem is neglected, both in information technology and in programming sciences, for ignoring that the source of meanings are human individuals: both those who "[...] send and receive a message, or those who write a program and make it possible to be executed" (Atlan, 2013, p. 158). Therefore, Atlan (2013) concludes that if DNA is in fact a program, this set of cells would play the role of a program in encoding the data. And, if DNA is in fact data, it would have the advantage of raising discussions and problematizations about DNA as a program. For the author, when the dimension analyzed is complex, a conduct in the sense of organization and adaptation shows results with disruptive effects and unplanned environment.

Henri Atlan develops the concept of DNA as "data" in opposition to DNA as a program, thinking exactly about the epigenetic mechanisms, which lead him to suggest that:

> What is transmitted is not just a static molecular structure, but a state of functional activity, that is, a certain expression of the functional significance of the set of cellular structures. Up to now, these phenomena of epigenetic heritability appear as anomalies or by comparison with the tendency of everything to relate to genetic determinations in the form of a DNA sequence. Therefore, they are relatively little studied, even though the necessary techniques are more complicated and less effective than those for cloning genes and their sequencing (ATLAN, 2013, p. 165).

For the author, it uses aspects with attributes to illusionism, followed by an erroneous conception of causality, in which the cause is excessive of its effect, in which it is attributed to the genome imprint properties mystery of what hitherto called life. And, as yet another illusory and magical trick, the program's metaphor reveals the essence of life, "[...] and this is quickly transformed into a sanctuary and heritage. The genome becomes, then, a fetish, fear generator as much as a fascination generator"(ATLAN, 2013, p. 171). The conception of DNA as a "program" is based on the principle of cause and effect, attributing to DNA the unique power to form a life such as the sequence written in its molecular bases. It disregards in this conception, the multiplicity of relations between the bases of the DNA itself (and, let's say, there may be many bases due to the size of the molecule), as well as the environmental interference on those relationships.

Therefore, the teaching of Biology, with regard to DNA, currently needs to reconfigure the linearity proposed in teaching materials and in the classroom discourse. In addition to that, it is important to bear in mind an understanding of life as something sophisticated, bringing the concept of DNA closer to a system that requires integration and, at the same time, complexity and dynamism in relationships. Atlan states that:

> Stable states of the network would modify the activity of certain genes, so that certain metabolic reactions dependent on this activity would cease, while others would be triggered, producing a modification of the structure of the network. Metabolism would thus be taken by another dynamic, different from that first order, towards a new stable state and so on… (ATLAN, 2013, p. 163).

Perhaps, the network structure, so called by Henri Atlan, would be configured as an alternative to program character, which, in turn, is very present in basic education textbooks. This discussion will be carried out in sequence, with the data analysis presented here.

III. The Pnld Biology

A popular resource in the educational process is the Textbook (LD). It is a work written by competent experts in the field, which has a common format. It includes school knowledge, fixation and complementary activities, experiments, illustrations, photographs, maps, guides for teachers and students, complementary readings, websites, applications, movies, among others. The LD is not a work directly linked to equipment or technological resources. In general, it is characterized as a print, very well accepted by the school community.

In Brazil, in 1929, the National Book Institute (INL) was created, an agency of the Ministry of Education (MEC), whose objective was to organize and systematize actions around textbooks. Almost ten years later, Decree Law No. 1006 of 12.30.1938, instituted a National LD Commission (CNLD) that was responsible to organize the LD for production, testing, and indications, among other things.

Among numerous restructurings in the field of democratization of LD was in 1985 that instituted in the country the National Textbook Program - PNLD. And, in 2004, the National Plan of Textbooks for High Schools (PNLEM) was implemented in order to provide the distribution of textbooks for public high school students throughout the country, by Resolution No. 38 of the Fund National Development of Education (FNDE) (BRASIL, 2019).

The FNDE is the agency responsible, together with the Ministry of Education, for the operationalization of the LD Programs throughout the country (FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO, 2015). After the implementation of the PNLD in 2004, it was only in 2007 that the Biology LD began to be distributed to all students and teachers in public schools across the country, with the exception of the State of Minas Gerais (idem, 2015). Since then, the collections of textbooks for the area of Biology in High School have been evaluated by teachers and specialists in the area, and then sent to schools. Among a number of works that arrive at schools, teachers choose the one they believe is most relevant, and the books are distributed free of charge to students at the school. Once adopted, the books are used for a triennium.

We observe, based on our practice as teachers, that the textbook is the most used didactic resource for the teaching and learning process in the classroom. Although the present LD is presented as a reflection of the school curriculum, many times, it articulates knowledge that present epistemological barriers in relation to the complexity of the phenomena approached (and SOUZA ROCHA, 2017).

In this sense, the epigenetic approach to DNA can be characterized as the most current within the teaching of Biology in elementary school, considering DNA as a given data in a complex cellular and environmental system. Keller (2000, p. 51) […] equating the genetic material of an egg with the magnetic tape of a computer does not in itself entitle us to regard that material as encoding a 'program'; it might

just as well be thought of as encoding 'data' to be processed by a cellular 'program'. Or by a program residing in the machinery of transcription and translation complexes. Or by extra-nucleic chromatin structures in the nucleus. Computers have provided a rich source of metaphors for molecular biology, but they cannot by themselves be held responsible for the notion of 'genetic program'.

It is important to emphasize that this research is not limited to pointing out conceptual errors, ideologies, graphic representation or methodological aspects presented in the textbooks of the last PNLD, adopted by teachers in schools in the State of Paraná. The objective is to build new terminologies for the mediation of school knowledge by Biology teachers in the use of textbooks adopted, in order to integrate new knowledge into the school curriculum. To this end, we seek to answer the following problem-situation: what are the conceptions about DNA used by teachers and reinforced in textbooks for and in teaching Biology?

IV. Methodology

The methodological approach of this research was quali-quantitative, interpretive in nature, with the analysis and categorization of questionnaires answered by teachers and the content of textbooks adopted by them with regard to teaching Biology and, more specifically, the DNA molecule.

According to Minayo (1997), a social research, as carried out in education, quantitative and qualitative data complements themselves, a fact that contributes to a more thorough analysis of the research problem as well as to the discussions and closing remarks.

Thus, within the universe of this research, we organized all the material as an instrument for data collection: questionnaires carried out with 10 (ten) Biology teachers of Basic Education in the State of Paraná and 8 (eight) LD from PNLD teachers for the years of 2018-2020 received and used as teaching material by these teachers.

In possession of the answered questionnaires and the books as material for analysis, the codification of these data was carried out, according to the adopted scientific educational concepts, so that we could then choose the following premises for appreciation, that is, the categories of analysis:

a. DNA as program/linearity and reductionism in the DNA teaching process preformationism conception program;
b. DNA as data/network structure and complexity/ epigenetics, both for teachers and for textbooks adopted.

a) Data extraction

The possibility of understanding how the systematization of knowledge articulated in the school occurs, mediated by teachers and presented by the adopted textbooks, leads us to present the context of school knowledge in Biology, as well as to point out more appropriate terminologies for the treatment of DNA with regard to episteme of knowledge that is systematized in a complex way.

Next, we present the instruments that we used to collect the data for this research.

b) Questionnaires

To analyze the conceptions of biology professors about teaching DNA, a questionnaire with 13 (thirteen) questions was constructed. These questions were related to teacher education (Degree in Biology, Specialization, Master's and Doctorate), the time the teacher teaches and the conception of DNA based on the discourse they used in the questionnaire.

The objective was to identify by means of probe questions whether the DNA is understood as a program or as given data and to what extent the LD influence the teachers' discourse in the classroom while preparing their lessons on DNA, protein synthesis and the epigenetics.

The ten (10) teachers participating in this research responded to the questionnaire, which adopted the ethical aspect of confidentiality of all information provided by professionals. The answers collected allowed us to analyze the conceptions of DNA mediated by the professors in the classroom in the discipline of Biology.

c) Textbooks

Collections of Biology LD analyzed are part of the collection distributed by the Government of the State of Paraná, provided by the Federal Government. There are 10 (ten) books that were sent for analysis by teachers in 2017 for the 2018-2020 triennium. Of these books, we carefully analyzed 8 (eight) of them under the focus of the presented methodology, all of which are part of the PNLD. The discrepancy between the number of textbooks sent by the Government for analysis and those carefully analyzed in this research was due to the teachers participating in the research not pointing out the arrival of all of them in their schools for analysis and choice.

After analyzing the responses of Biology teachers and the theoretical framework of textbooks adopted in this triennium, the inferences and critical-reflections are presented in sequence, as well as some notes according to the scientific community in the educational area.

V. Presentation and Discussion of Data

This work aims to look at and analyze the concept of DNA the basic education teachers draw under, as well as the LD used by them under the perspective of Henri Atlan which allows an opening to

problematize fields in relation to the concept of DNA that is mediated in the classroom.

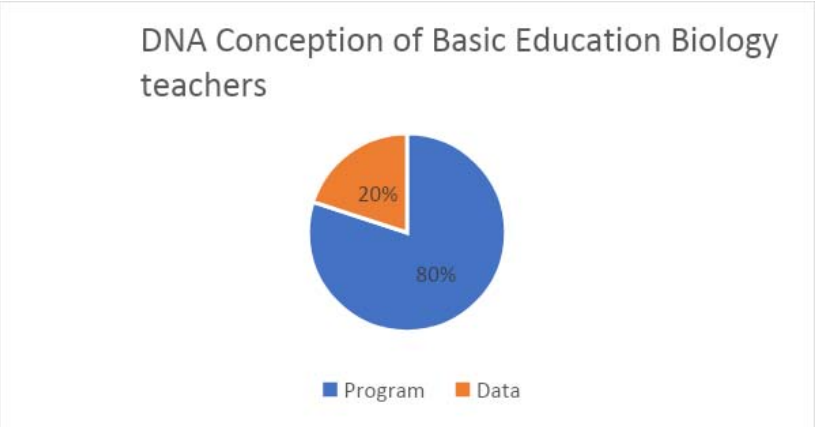
For Henri Atlan (2013, p. 157) "the notion of genetic program is the most fruitful metaphor in Biology today [...], but this is nothing more than a metaphor that allows naming a set of mechanisms that are still not well known". Still, for the author, understanding the ideas of the complexity of DNA and that the genetic is not just in the gene, constitutes one of the challenges of complexity.

In view of this, the data collected from the questionnaires conducted with participating teachers of this research and the LD adopted the same last PNLD was analyzed. Then, a general parameter is presented on how the approach to the DNA theme occurs in the classroom and corroborates the statements of the DNA metaphor proposed by Atlan, in order to contribute with scientific-educational knowledge for the use of more appropriate terminology for the educational context, that which is linked to scientific and technological development.

a) DNA as a program/linearity and reductionism in the DNA teaching process/ preformationism program

According to Atlan, in program design, DNA will always perform the same functions, as expected from a computer program. For him, "[...] the program operates on the data and processes it. The same program will always carry out the same operation, which will always have the same structure [...]" (Atlan, 2013, p. 159-160), that is, the knowledge of epigenetics and the influence of the environment ceases to be valid when DNA is treated like a program.

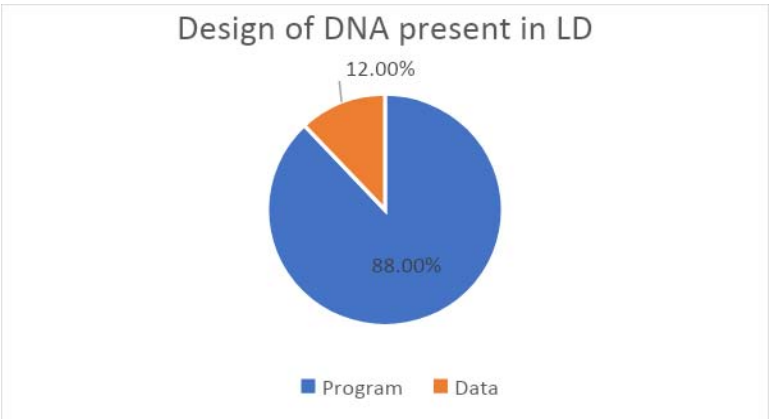
Thus, the analysis of data from the questionnaires and LD adopted by teachers show that the DNA characteristics as a program was the approach mostly used by the participating teachers. Both the responses of teachers, as well as in the analysis of LD have shown that to characterize DNA as program in a concept of linearity and also reductionist, has been the teaching focus for both those who teach as well as those who write the LD for students. These data are quantified next and shown in Graphs 1 and 2:



Source: The author based on research data

Graph 1: DNA conception of Basic Education Biology teachers

It was found in the questionnaires answered by the teachers that 80% of them categorically state that DNA is a program. And when the teachers' response is related to the content present in the textbooks adopted, it is verified that the latter also takes an approach of DNA linearity, as we quantified in the graphs that follow:

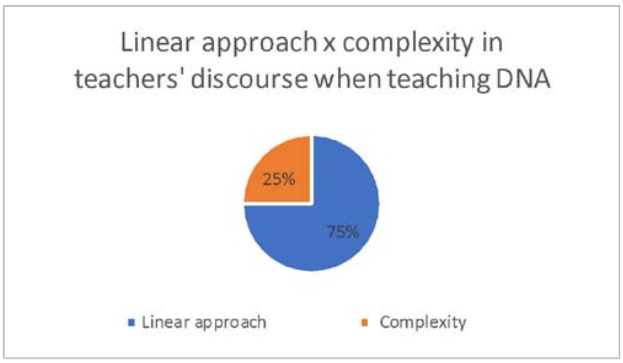


Source: The authors based on research data

Graph 2: Design of DNA present in LD

As for the DL, of the 8 (eight) analyzed, approximately 88% address the concept of DNA as a program, referring to it as a "template", "carrier of genetic information" or simplifying its performance with the following metaphor: " changing the number and sequence of the letters, we alter the phrase". Only one work puts DNA in the condition of data. It emphasizes that "DNA contains information regarding the structure and functioning of the organism, yet it is only part of a complex mechanism", providing DNA with a characteristic of data that, when combined in different ways, acts on the complexity of gene performance. As for the DNA approach, the professors state that the LD collection adopted in the last triennium approaches DNA superficially, considering the DNA - RNA - protein linearity, without approaching the cellular mechanisms regulating gene expression, and epigenetics.

Still, we observe quantitatively that the discourse of 75% of teachers participating in this research, the whole is constituted as the sum of the parts, when referring to DNA as a program. In a complex approach, recognition of the DNA concept is not linked to the parts, but to its internal and external interrelationship, that is, between the concept of DNA and the environment in which it is found, as shown in Graph 3:



Source: The authors based on research data

Graph 3: Linear approach x complexity in teachers' discourse when teaching DNA

Still, when questioned about the Human Genome Project (PGH), all the participating teachers answered that the objective was to map, identify and demarcate genes in order to know how each one of them works. It is observed in this question, that the idea of "mapping" and "establishing" within this mapping is to identify exactly what each gene did/does. Once again, we notice the linearity present in the teachers' conception of DNA. This makes us wonder whether really the design of DNA data as part of the conception of the universe of the participating teachers in this research and the how urgent is the mediation of knowledge networked, in contemporary times, to the classroom.

This same linearity was found by Joaquin and El- Hani (2010, p. 94) when they carried out a study on the need to revise the gene concept. For the authors, the PGH also conceptualizes the gene in a reductionist and linear way, "in a classic molecular model, according to one in which a gene is a DNA fragment that encodes a functional product (polypeptide or RNA)". It is also important to mention at this point that very little of the new knowledge about the advances found in Molecular Biology actually reach the classroom, as shown by the analysis of the data results of the questionnaire regarding teachers' conception or by the textbooks adopted in the last PNLD in the State of Paraná.

For Joachim and El- Hani (2010), to review the concept of the gene as a DNA fragment encoding a protein require that research with so-called junk DNA, micro-RNAs, si-RNAs, pseudogenes, Retrogenes, silencing genes, among other knowledge elaborated in the post-PGH, are didactically transposed in the textbooks and presented to the teachers. This can occur in processes of initial and continuing education, which become part of the knowledge mediated by teachers in the classroom, as it provides students with an understanding of the complexity of the gene/DNA, for example, in the formation of the characteristics of eukaryotes:

> The meaning of a gene is not contained in the nucleotide sequence of DNA, but emerges as a process involving the system by which genes are interpreted, including the cell and, in a series of flukes, the supracellular environment. Thus, genes are not given in the DNA, but are made by the cell. This vision is, for researchers, fundamental to the understanding that it is not the DNA that controls the cell, it is not the DNA that 'does things' with the cell, as is often taught, but the cell is the one that 'does things' ' with DNA, which is a repository of useful biological information and not a catalyst for processes or a development program or a cell controller (JOAQUIM and EL-HANI, 2010, p. 110-111).

Thus, DNA gene review of the concept proposed by El-Joachim and Hani supports the proposal advocated here by Henri Atlanta Georgia (2003, 2006 and 2013) to treat DNA as a data set used by the cell as its biological mechanisms and interaction with the environment.

Therefore, both the teachers' discourse and the textbooks adopted for teaching Biology contributed to this analysis and conclusions of how DNA has been

mediated in the classroom with our students. A mediation that aggregates conceptions of DNA as a program and not as data, demonstrating the linearity of working with the theme in question. Although Biology is conceived within the Newtonian mechanistic model, new studies point to a paradigm shift regarding the concept (Atlan, 2003, 2006 and 2013) and, therefore, a differentiated proposition needs to be proposed in order to advance towards teaching Biology as a complex approach.

Thus, when considering the complex approach to knowledge, it is important to take into account disorder and chance, circularity, unity in multiplicity and contradiction. For Morin (2006), with regard to studies of complexity, it is necessary to adopt a notion of 'system' as one of the operators of knowledge. With this research, the potential in mediating the concept of DNA at school through and in complexity is pointed out. Terminologies based in the 'complex systems', which give the non-linearity of the DNA concept reveals in fact how this molecule behaves in a 'system', for example.

Therefore, it is important to emphasize the need for knowledge mediated in the school curricula be linked to approaches which have been discussed and presented in the academy (wise learning) going through successive transpositions Teaching (Chevallard, 2013) until these are embedded to the school's curriculum and textbooks (learning to teach).

This review of concepts, both in textbooks and in the discourse of teachers is extremely necessary, considering that the reductionist thinking does nothing to contribute to the students' adequate appropriation of the form and function of DNA in cells. For this reason, DNA needs to be understood as a networked and extremely complex data structure, as presented and discussed below.

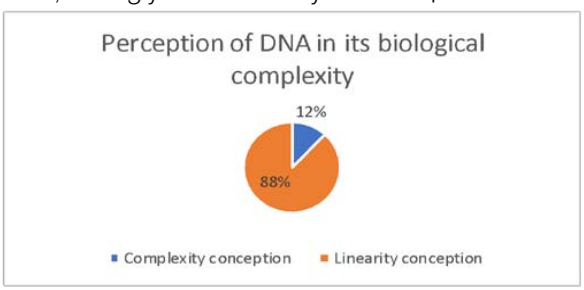
b) DNA as data/network structure and complexity/ epigenetics

We rely on authors as Henri Atlan and Edgar Morin, which contributed with their research in recent decades as they warn us that the complexity relates to an interaction between systems. An approach defended by Atlan (2013) is DNA as data in a systemic and quite complex structure, understanding that, as "data" is observed, DNA has multiple possibilities of combining these data in a dynamic process, strongly influenced by the gene regulation of each cell type and by epigenetic mechanisms.

This epigenetic approach appears very timid in the textbooks analyzed in this research. It is important to emphasize that, a priori, it focused on the teachers' discourse about the design of DNA and how it is reinforced in the textbooks adopted by these professionals in their schools. However, we carefully analyze these adopted textbooks, according to the epistemic foundations presented and discussed, because of the expressive number, a total of 60% of the professors participating in the research, do not know the term and choose not to answer the question, or even, they do not notice the presence of the concept or research with epigenetics in the adopted textbook. From the teachers who answered the questions in the questionnaire: "In the Biology Textbook adopted by your school/college in the last National Textbook Plan (PNLD) how is the theme DNA approached? Does research with epigenetics appear in the chapter that addresses the topic of DNA?", the analysis of the participating teachers answers shows that "DNA is approached in a very theoretical and traditional way, with indications for further complementary readings and the epigenetics is practically non-existent" (teacher 1), or even, "there are few subjects that deal with questions about epigenetic research" (professor 7).

In this aspect, it can be seen from the analysis of the data collected, that the statement of teachers is closely linked to the LD they adopted. From the eight (8) LD analyzed only one (1) presents the epigenetic conception of DNA (as given) and systematizes it as content for High School. Therefore, the present discourse of teachers in the State of Paraná on DNA is strongly based on the textbooks adopted, in which the reductionist/linear approach predominates.

In a DNA-as-data approach, the complexity of cell-DNA interactions are important factors to be considered in teaching and, therefore, recent epigenetic research needs to be present in textbooks, as well as in the knowledge of teachers in the classroom. According Atlanta Georgia (2013), a paradigm shift occurs to the extent of the linearity (DNA-characteristic) becomes considered from the complex (DNA-epigenetic). Unfortunately, it can be seen from the data collected that this paradigm shift is still a long way off, as shown in Graph 4.



Source: The authors based on research data

Graph 4: Conceptions in teaching DNA

This way, we found that only 20% of teachers participating in this research can visualize the DNA as a data set that operates on functions of different cell situations, but only the relative percentage to 10% of these, present justifications for such an approach as, for example, what we call teacher 8: "I try to demonstrate that even the portion of DNA that is not part of a gene has or can have a future function", that is, an understanding of DNA as a given, just like Henri Atlan (2003, 2006 and 2013), proposes in the study of the same.

The teachers discourse, when considered collectively, it is a given data that obscures the phenomena of interrelations at different levels of activity. What we mean is that it is determinism rooted in positivism, even today, it is responsible for explaining the very phenomenon of life. This occurs in the teachers' discourse (although few still present conceptions of DNA as data), and they end up reinforcing this concept with the program approach, as well as in the adopted textbooks. We observe that teachers do not have a critical and reflective position to problematize and place this situation/condition at the center of controversies in the classroom.

On the other hand, when we consider DNA within a systemic and complex approach, it naturally starts to dialogue with uncertainty and chance. DNA as a network structure is dynamic and at the same time contemplates order, disorder and self-organization, which means pointing to noise (Atlan, 2013). The noise considered from Shannon's Communications Theory is a random element, which includes a set of communicative meanings and provides new ways to arrive at an answer, according to Henri Atlan. This does not mean that we are denying determinism and the laws that govern science as a whole, but we want to point to a complex structure that must be considered in order to propose the construction of new knowledge. And, in particular for this research, in which we point out such terminologies discussed as appropriate for classroom work as with the concept of DNA.

Inserting the concept of epigenetics as a branch of biology that "studies change in gene functions without changing the base sequences (adenine, guanine, cytosine and thymine) of the DNA molecule" (Fantappie, 2013, p. 1) is one of the factors that will contribute to the systemic and complex design of DNA. Another factor to be considered is to include in the school contents of the biology textbooks, the study of the history and philosophy of science in relation to DNA studies, so that teachers understand how reductionist concepts change with new research in the field of Genetics and Molecular Biology, transforming a mechanistic-reductionist paradigm into a thought of complexity.

VI. Final Considerations

The results of this research demonstrate the reductionist and genetic program vision when addressing DNA in the classroom with Basic Education students. Both the teaching material used by the teachers, in this case the textbook, as well as their discourses point to this path.

After so much research in the area of Molecular Biology, Genetics and currently the knowledge of Epigenetics, it is necessary to review the contents of the textbook that refer to DNA, addressing the issue in a more complex and interrelated way, inserting the concept of "data" in approaching this molecule and avoiding DNA-RNA-protein linearity. We observe that such an approach is so common and that it leads to errors of cause-effect, part-whole and it is reproduced in the discourse of teachers in the classroom.

Referring to the DNA as a set of data, the Didactic Transposition with their relationship between knowledge wise, learn to teach and taught knowledge forwards to include in the school knowledge research developed mainly in the last five decades. It is essential that the complex mechanisms of gene expression, which involve numerous studies of DNA, but also of RNA, proteins and the cellular environment that act in the phenotypic determination of genetic characteristics, be present in the school's curricula.

According to Atlan (2013, p. 165) "until now, these phenomena of epigenetic heredity appear as anomalies or exceptions compared to the tendency of everything that relates to genetic determinations in the form of DNA sequences. Therefore, they are relatively little studied, even more as the necessary techniques are more complicated and less effective than those for cloning genes and their sequencing".

The above statement by Henri Atlan clarifies the data found in this study, demonstrating that teaching DNA as a program is simpler and easier to justify, while the introduction of epigenetic concepts treating DNA as a data set implies systemic knowledge from the authors of the textbooks to carry out the didactic transposition adequate to the theme, and it also demands from the biology teachers a continuing education so that the idea of DNA as a complex system is explicit in their classroom discourse.

For Keller (2000) "the deterministic role of genes to produce traits may have been taken for granted by many, but their control, regulation and biological context at the cellular level was seen as interactive" and, therefore, complexity tests are essential for teachers to produce materials in an interactive and integrative DNA-cell perspective while, in the collective construction of knowledge, it enables students to understand the hologram of the cell. Therefore, inserting the complexity of scientific knowledge, understanding Biology and the study of life beyond disciplinary fragmentation, teaching

about DNA as a set of data with different combinations and performances, as shown by recent discoveries in Molecular Biology, is a challenge for the development of teaching materials that address this perspective, as well as teacher continuous education with the aim of updating them to this new terminology in the paradigm of complexity and, "consequently, it can be conjectured that knowledge in modern genetics and genomics can neutralize beliefs in the excessive attribution of trait formation to genes and, therefore, beliefs in genetic determinism" (Gericke et al., 2017, p. 1251), because the first approach, the analytical one, led to the fragmentation of knowledge and, therefore, we need to reconstruct it to better teach (ROSNAY, 2013).

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Didáctica de Educación Emocional EMOTI, la Pedagogía del Amor en Educación Infantil

By Alicia Hurtado Marín

Resumen- Este artículo describe el desarrollo anual del Programa EMOTI de educación emocional, aplicado en centros educativos de Lorca (Murcia), con alumnado del ciclo de Educación Infantil, sobre un total de 304 niños. Se analizan los datos recogidos desde diferentes prismas que han compuesto la investigación evaluativa. Conviene resaltar que ya en el primer trimestre el alumnado habían alcanzado porcentajes de entre un 75%- 80% de «logro total del objetivo» en competencias emocionales de «Percepción y Conciencia Emocional».

GJHSS-G Classification: *FOR Code: 339999p*

Strictly as per the compliance and regulations of:

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Alicia Hurtado Marín

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I. Introducción

Teniendo en cuenta todos los objetivos generales que se plantean para la Etapa de Educación Infantil desde el Decreto 254/2008 de 1 de agosto por el que se establece el Currículo del 2º ciclo de Educación Infantil en la Comunidad Autónoma de la Región de Murcia. España.

Y asimismo el (Real Decreto 1630/2006, de 29 de diciembre, por el quese establecen las enseñanzas mínimas del segundo ciclo de Educación infantil), durante esta etapa.

Objetivos de etapa del segundo ciclo de Educación infantil:

(a) Conocer su propio cuerpo y el de los otros, sus posibilidades de acción y aprender respetarlas diferencias.
(b) Observar y explorar su entorno familiar, natural y social.
(c) Adquirir progresivamente autonomía en sus actividades habituales.
(d) Desarrollar sus capacidades afectivas.
(e) Relacionarse con los demás y adquirir progresivamente pautas elementales de convivencia y relación social, así como ejercitarse en la resolución pacífica de conflictos.
(f) Desarrollar habilidades comunicativas en diferentes lenguajes y formasde expresión.
(g) Iniciarse en las habilidades lógico-matemáticas, en la lecto-escritura y en el movimiento, el gesto y el ritmo.

Trabajando cada uno de sus bloques, objetivos y contenidos de las tres áreas que engloba el Real Decreto del currículo oficial de Educación Infantil, *se destacan los siguientes objetivos de área, donde se refiere de manera breve objetivos de Educación emocional:*

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Área: Conocimiento Del Entorno. (De los 8 Objetivos que componen esta Área, solo el objetivo 2. hace alusión a las emociones).

Objetivo 2. Relacionarse con los demás, de forma cada vez más equilibrada y satisfactoria, interiorizando de manera progresiva las pautasde comportamiento social y ajustando su conducta a ellos.

Área: Lenguajes Comunicación y Representación (De los 10 Objetivos que componen esta Área, solo el objetivo 2. hace alusión a las emociones).

Objetivo 2.- Expresar emociones, sentimientos, deseos e ideas mediante la lengua oral y a través de otros lenguajes, eligiendo el que mejor se ajuste a la intención y a la situación.

Área: Conocimiento De Sí Mismo y Autonomía Personal. (De los 9 Objetivos que componen esta Área, solo objetivo el 3. hace alusión a las emociones).

Objetivo 3. Identificar los propios sentimientos, emociones, necesidades o preferencias, y ser capaces de denominarlos, expresarlos y comunicarlos a los demás, identificando y respetando, también los de los otros.

Se puede observar que existe la intención de introducir la Educación emocional en los currículos oficiales de la Etapa de Educación Infantil 2º Ciclo. Y es en esta proyección de incluir la Educación emocional, en un futuro que ya está aquí, el motivo por el que se diseña el Programa Anual EMOTI. Reuniendo la perspectiva teórica de la Inteligencia Emocional y diseñando una actuación por programas, que complementa y amplia el contenido en Educación emocional del currículo de la Etapa del 2º Ciclo de la Educación Infantil, en el ámbito del conocimiento emocional, creando un currículo emocional propio. Ha día de hoy podemos constatar el reconocimiento y predisposición, que el sector docente refiere al desarrollar Inteligencia emocional en sus aulas. Defendiendo la necesidad de incluir este proceso de enseñanza-aprendizaje crucial para el buen funcionamiento del sistema educativo en todos sus contextos, siendo la base del buen desarrollo académico de los alumnos. En este sentido el desarrollo de la experiencia de innovación educativa en Inteligencia Emocional que se ha vivido con el programa anual EMOTI, en 17 aulas de Educación

Infantil, ha conseguido trascender al contexto familiar y social, ampliando el contexto de aprendizaje y proyectando sus beneficios afectivos y de equilibrio emocional muy significativamente.

II. Diseño Aplicación y Evaluación de un Programa de Educación Emocional Para la Etapa de Educación Infantil

a) Antecedentes

La andadura del Programa anual EMOTI comienza con la primera edición (2014) de los cuentos de Emoti que dan a conocer y trabajan las cuatro emociones básicas, rabia, alegría, miedo y tristeza (estudio realizado en el Instituto de Neurociencia y Psicología de la Universidad de Glasgow, 2014) Y una 2ª edición del libro infantil «Emoti 4 colores 4 emociones» Hurtado A. (2016). Sevilla. Editorial: Babidibú. Homologado por la Junta de Andalucía como material curricular de uso docente (Resolución 18/marzo 2019) y con el aval de ASEDEM (Asociación Española de Educación Emocional).

Con la realización de talleres de Inteligencia Emocional, desarrollados con este libro y Emoti como material físico y pedagógico, ofrecidos por el Excelentísimo Ayuntamiento de Lorca junto con la red de bibliotecas de esta localidad (2015/16), a los alumnos de Infantil y primer tramo de Primaria de los centros educativos de Lorca. La experiencia de los talleres de Inteligencia Emocional se extiende a toda la Región de Murcia y es desde la Consejería de Educación desde el Departamento de Programas educativos y atención a la Diversidad, junto con el Observatorio de la Convivencia Escolar, quienes dan vía a la autora del Programa Hurtado, A. a realizar dichos talleres en centros educativos de toda la CARM. En los talleres Hurtado, A. Para poner en práctica las dinámicas, metodologías y recursos multisensoriales, del todavía proyecto, que a posterior pasaran a ser las actividades del A, Hurtado. (2019) «Programa anual Emoti de Inteligencia Emocional para Educación Infantil y primer curso de Educación Primaria» Murcia. Paralelamente a la experiencia tan enriquecedora que resulta de los talleres, se recogen datos, en los centros educativos, a través de cuestionarios que preguntan las opiniones y propuestas de los docentes que toman contacto con el Proyecto. De estos cuestionarios se extrae la necesidad de instaurar Inteligencia Emocional en las aulas de Educación Infantil y Primer tramo de Primaria, respaldada por las opiniones de los docentes y se empieza a configurar el actual Programa.

En el período comprendido del año 2016-2018 se realiza una investigación de la cronología de autores y teoría que sustenta la Inteligencia Emocional como ámbito de conocimiento, y se sientan las bases del aspecto formativo del «docente especialista», que el Programa ofrece a los docentes, equipos directivos que lo van a desarrollar en sus centros, y la elaboración de la fundamentación teórica y el diseño completo de la estructura del la 2ª edición del Programa anual EMOTI. En el año 2018 la Consejería de Educación de Región de Murcia, emite la Resolución del 10 de octubre 2018, por la que se otorga al A, Hurtado. (2019) «Programa anual Emoti de Inteligencia Emocional para Educación Infantil» Murcia. 2ª Auto-Edición, la oportunidad de cursar el Programa anual EMOTI una hora semanal, en tres centros públicos, de contextos socio-culturales distintos en la ciudad de Lorca.

Y es al cierre, de esta experiencia de innovación educativa en Inteligencia Emocional, cuando el Programa anual EMOTI es homologado por la Consejería de Educación de la Junta de Andalucía, que desde la Dirección General de Ordenación y Evaluación Educativa, lo acredita como Material Curricular de uso docente en los centros. (Resolución de 8 de julio 2019)

En la actualidad y después de la maravillosa y positiva experiencia de Pilotaje Oficial, cursada en centros públicos de Lorca, elegidos para el Desarrollo del Programa EMOTI, se dispone de un Dossier de evaluación completo, que nos muestra desde distintos prismas y herramientas evaluativas utilizadas, un resultado muy positivo y ampliado a los tres contextos escolar- familiar-social. Dicho Dossier de evaluación en una proporción de muestra, se ha incluido en el, A, Hurtado. (2019) «Programa anual EMOTI de Inteligencia Emocional para Educación Infantil y primer curso de Educación Primaria» Murcia. 3ª Auto-Edición. Con el objetivo de ser una fuente de motivación para los docentes que lo desarrollen, e informar, en qué nivel de adquisición de las competencias emocionales han conseguido nuestros alumnos. Asimismo incluye opiniones y datos de la implicación y grado de satisfacción de los docentes tutores, equipos directivos, el informe de la evaluación del pilotaje de formación en el aula a CPR (Centro de Formación de Profesorado, Región de Murcia) y de los seminarios de formación paralelos al desarrollo del programa anual durante el curso 2018/19impartidos por la autora, en las aulas en los tres centros, opiniones del desarrollo del programa de «puño y letra» de las familias implicadas, recogidos en los cuestionarios del Observatorio de la Convivencia Escolar para familias y docentes.

b) Formación del profesorado

Para el buen desarrollo del Programa anual EMOTI, se necesita que los docentes implicados cursen formación en Inteligencia Emocional, y del manejo del Programa. Para ello se elabora un curso de formación autónoma que a través de CPR. (Centro de Formación de Profesorado, Región de Murcia) con el cual A, Hurtado comienza a formar docentes interesados en implementar este ámbito del conocimiento en sus aulas y colegios. Esta formación incluye la fundamentación teórica de este ámbito de conocimiento y se les enseña

la estructura completa del programa, objetivos, contenidos, metodología, actividades, recursos materiales, pautas metodológicas de uso de materiales, rincón de las emociones, de los juegos, orientaciones, herramientas de evaluación… En 5 sesiones de 3.30 h un total de 20h. Justificación del proyecto de formación autónoma:

Enumeramos los motivos que justifican la necesidad de implementar un Programa de Educación Emocional:

Las competencias socio-emocionales son un aspecto básico del desarrollo integral del ser humano y de la preparación para la vida. Educación Integral.

Hay un interés creciente por parte de los educadores y familias en aprender y enseñar Inteligencia Emocional, lo que manifiesta su implementación.

Acabar con la violencia es uno de los retos del siglo XXI, la Educación Emocional tiene mucho que ver en ello, solo las personas emocionalmente estables serán capaces de resolver conflictos de manera pacífica.

En la actualidad son muchos los sectores que emplean las plataformas emocionales para sus fines utilizando «manipulación emocional» aprender a clasificar y procesar esta carga emocional, es necesario para no ser manipulados. Muy especialmente las niñas/os «nacidos digitales»

Es una prioridad el dotar a los niños/as de estrategias de afrontamiento de situaciones adversas y resolución de conflictos de manera constructiva y no violenta, poniendo en valor el equilibrio emocional propio.

Es necesario que nuestros niños entrenen y desarrollen la Asertividad y la Empatía, como herramientas de autodeterminación frente a situaciones de riesgo y dispongan de capacidad de sentir a los demás, para ayudar, comprender consolar y romper el individualismo y egoísmo de una sociedad vacía de valores humanos.

Atendiendo a los Objetivos Generales, a los específicos de las Áreas De Competencias Emocionales, y de los Objetivos para el docente y sus Contenidos del, A, Hurtado. (2019) «Programa anual Emoti de Inteligencia Emocional para Educación Infantil y primer curso de Educación Primaria» Murcia. Se forma a los docentes de los tres centros educativos que van a cursar el Programa.

Para realizar un seguimiento y una formación continua formativa paralela al proceso del curso se efectúa un Seminario Anual 30 h distribuidos por 2 h semanales a lo largo del curso, en las siguientes actividades de formación:

Formación con el Equipo Directivo.

Formación de ciclo.

Formación de padres y tutorías.

Formación con el AMPA.

El Seminario Anual se utiliza también para, Preparación de Actividades, evaluación trimestral, escalas de observación, evaluación individual por actividad, cuestionarios, etc. De esta experiencia de formación dual, con pilotaje de aula y Seminario Anual, se extrae al finalizar el curso escolar, la efectividad de esta formación, que ha formado al docente tutor, con las capacidades y herramientas necesarias para seguir con el desarrollo de la Inteligencia Emocional de sus alumnos en su futuro profesional. Contando con la actitud positiva del docente como base, la formación teórica y metodologías de desarrollo en el aula, que aseguran su capacitación y buena disposición. La prueba de la efectividad de la formación dual con experiencia de pilotaje en el aula, queda recogida en este año escolar 2019- 2020 al comprobar cómo las maestras tutoras que cursan el programa anual EMOTI en el pasado curso escolar 2018/2019, Comienzan su programación anual 2019/20. Desarrollando el programa EMOTI de manera autónoma, habiendo incluido su metodología en las programaciones de cada curso y reservando una hora a la semana para desarrollar las sesiones. Siendo un gran logro para conseguir el objetivo del Programa EMOTI, la Instauración del mismo en el currículo oficial de Educación Infantil.

c) Intervención de las Familias

El contacto con las familias comienza en la reunión de presentación del inicio del Programa anual EMOTI, en octubre del 2018, ofreciéndoles una presentación de información-formación de los conceptos básicos sobre la Educación emocional, así también, de entrega un «Cuadernillo para Madres, Padres y Tutores» donde se les ofrece la «Teoría de las Inteligenciasmúltiples» H, Gardner. (1983) con ejemplos de cada una de las inteligencias. Esta información forma parte de una de las actividades Familia-Escuela que propone el programa, así también se incluye en este «Cuadernillo» las letras de las canciones del CD «Sí cantas esta canción cambiarás tu emoción» (material propio del programa) y la letra de la «Poesía de la Tristeza» como recursos para trabajar con sus hijos y elaborar las actividades. Observamos el interés y motivación que las familias demuestran tener respecto, a que sus hijos desarrollen su InteligenciaEmocional y así no lo refieren.

A lo largo del curso escolar 2018/19 son varias las tutorías que las familias mantienen con la especialista A, Hurtado, de reflexión, consulta y satisfacción de ver a su hijos aprender y gestionar sus emociones, de igual forma son muchos padres los que les hacen llegar a las tutoras su satisfacción del desarrollo del programa.

Como última toma de contacto con las familias se realiza en la reunión dedespedida y cierre del programa EMOTI 2018/20. Para esta ocasión y a modo de reflexión y exposición de todo lo trabajado con los niños en elaula, se les proyecta un video de recopilación de las actividades y abrimosuna charla para recoger sus opiniones y propuestas y en este mismareunión se les entrega el Cuestionario del Observatorio de la Convivencia Escolar, para recoger la experiencia desde el punto de vista de las familias. A continuación se adjunta una muestra tabla de recogida de datos. (Datos recabados de 151 cuestionarios realizados por las familias).

PREGUNTA 4. Nivel de satisfacción con las actividades propuestasfamilia-escuela por el Programa EMOTI.		
1. NIVEL BAJO	2. NIVEL MEDIO	3. NIVEL ALTO
0,7%	17,2%	81,5%

Datos extraídos de los cuestionarios para familias del Observatorio de la Convivencia Escolar (2018/19). Incluido en Anexos.

Las opiniones de las familias son todas positivas, recogemos sus narraciones y ejemplos que nos trasmiten de cómo sus hijos han vivido y contado la experiencia de su aprendizaje emocional en sus casas. A continuación se ofrecen tres de las 74 opiniones escritas de puño y letra de las familias, recogidas en la última casilla, para opinión libre, del cuestionario para familias del Observatorio de la Convivencia Escolar:

«El programa EMOTI ha sido muy motivador para mi hija ha aprendido muchos conceptos sobre las emociones y a reconocerlas. En el día a día hablamos de las emociones con naturalidad y las actividades realizadas han sido muy significativas y les ha provocado placer. Mi propuesta de mejora consiste en que deberían haber más sesiones a la semana». (Madre, 1976, CEIP Virgen de las Huertas)

«El Programa EMOTI nos ha parecido muy interesante por todo lo que les hatransmitido a nuestros hijos. Raquel lo ha vivido de una manera divertida y muy ilusionada. Cada jueves por la mañana nos recuerda que hoy viene la"Seño Alicia" para trabajar con EMOTI. Nuestra casa está llena de camaleones dibujados de todos los colores. Nos transmite su ilusión explicándonos todo lo que aprende sobre las emociones. Es una lección aprendida que le acompañará el resto de su vida. Muchísimas gracias». (Madre, 1974, CEIP Virgen de las Huertas)

«Como un profesional del ámbito de las fuerzas del estado creo muy importante que nuestros niños estén equilibrados emocionalmente, y que sea a esta edad cuando se les inculque el aprendizaje de las emociones. Mi hijo la ha vivido con mucho entusiasmo, ha sido toda una experiencia que hemos vivido toda la familia y hemos aprendido todos mucho acerca del mundo emocional. Muchísimas gracias a la Seño Alicia por su buen trabajo».

(Padre, CEIP Virgen de las Huertas)

Se recogen por tanto, sus propuestas firmes de continuidad del programa EMOTI, así como su gran satisfacción y una petición bastante generalizada de estar en disposición de asistir y formarse a través de cursos de Inteligencia Emocional, que desde el AMPA se les pueda realizar.

d) Metodología de evaluación

La programación de la evaluación del desarrollo de experiencia de pilotaje e innovación en Inteligencia Emocional del programa EMOTI, se elabora con premeditación, desde un pensamiento sistémico, atendiendo al modelo CIPP de Stuffebeam y Shinkfield (1987) que asegure una evaluación completa del planteamiento de evaluación, analizando y evaluando, el contexto, de entrada (planes), del proceso y del producto. Con este objetivo se preparan diferentes herramientas evaluativas, desde un prisma cuantitativo y cualitativo, evaluando: ámbitos y contextos de actuación, materiales pedagógicos utilizados, la metodología, las actividades al día, la actuación del especialista y repercusión del desarrollo del Programa, a través de:

- Boletines de evaluación de los alumnos
- Tabla de evaluación de Actividad.
- Cuestionarios elaborados por el Observatorio de la Convivencia de la CARM, para docentes y familias.
- Observaciones del anecdotario del Programa, de las tutoras y especialista.
- Sesiones del Seminario de seguimiento del Programa Anual, dirigidas por la especialista, A, Hurtado. Aprobados por el CPR. De la CARM. De reflexión y ampliación a tiempo real de la experiencia de pilotaje en el aula.
- Tutorías con las familias implicadas.
- Entrevistas realizadas desde los medios de comunicación (Comarcal TV, periódico «La Verdad», Revistas locales)

Con toda la información y datos recogidos se elabora el Dossier de la evaluación completa del Programa, que se facilita a la Consejería de Educación de la CARM, para su análisis y posterior divulgación en el contexto educativo. Expensando la conformidad del programa de ser apto para su Sistematización como «Modelo de habilidades emocionales y cognitivas» para la instauración en el Currículo de Educación Infantil.

III. Sistematización de la Experiencia Educativa

La sistematización de experiencias educativas constituye una estrategia para comprender más profundamente las prácticas de intervención y acción social para recuperar saberes que se producen en la experiencia y generar conocimiento sistemático sobre ellas. En este sentido va dirigida directamente las conclusiones y reflexiones recabadas del desarrollo anual de programa EMOTI 218/19. Se consideran muy importantes todos losdatos recabados, ya que la experiencia ha sido capaz de trascender el ámbito de la escuela para llegar al contexto familiar y social, de forma significativa en cuanto a conocimientos emocionales difundidos.

Así lo transmite JARA (2016)

«La sistematización es entendida como el proceso de clasificar catalogar y ordenar datos e informaciones para ponerlos en el sistema en el ámbito de la educación y de los proyectos sociales y emocionales»

Es por tanto necesario realizar un análisis profundo de una experiencia educativa tan relevante como lo ha sido el cursar el Programa Anual EMOTI con 304 alumnos del ciclo de Educación Infantil, en centros públicos de Lorca. A continuación se hacen un análisis de los distintos recursos pedagógicos, que ofrece el Programa en los contextos de actuación: Familiar y Escolar.

IV. Análisis de Algunas de Las Secciones Del Programa

a) Análisis de los resultados de los materiales pedagógicos de «creación propia» de los que dispone el programa.

1. Análisis de Emoti como recurso pedagógico.

Gracias a nuestro protagonista animal Emoti, un camaleón multicolor, y su característica especial, ser el «Detector de emociones de la clase Alegría», se ha conseguido introducir el desarrollo de la educación emocional en los niños de manera lúdica y efectiva. «Emoti tiene una misión mágica» captar la emoción del niño y exteriorizarla a través del cambio de color de su pie. Con esta característica especial se ha conseguido captar la atención e interés de nuestros alumnos. De esta manera tan atractiva y divertida conseguimos que visualicen la emoción y la identifiquen. Emoti Ha cumplido funciones tales como: semáforo de emociones, gestor de emociones, catalizador de las emociones, e impulsor de la Alegría, que es su color preferido y estado de ánimo que más le gusta.

Emoti como recurso pedagógico de aprendizaje emocional ofrece al niño un aprendizaje emocional integral, porqué se facilita el conocimiento de cada emoción y la trasferimos a los niños desde todos sus niveles:

(1) Conectando color- emoción de esta manera presentamos conceptos tan abstractos para el niño de Infantil, como lo son las emociones, etiquetando cada una de ellas con un color.

(2) Ejemplificando cada una de las emociones con una situación o vivencia de EMOTI acompañando dicha explicación, con la somatización que nuestro camaleón experimenta en su piel a nivel fisiológico y por último les contamos a nuestros alumnos, como Emoti se libera de esa emoción que le "atrapa" describiendo la estrategia de Regulación Emocional que utiliza para realizar el cambio emocional y volver a la Alegría que es su estado natural, que a nuestra mascota le gusta más estar y sentir…

Así quedan conectados de manera jerárquica los conocimientos emocionalesintegrales:

Emoción-Color-Vivencia que la Genera-Somatización FisiológicaEstrategia de Regulación.

2. Análisis de actividades anuales familia-escuela.

En la evaluación de una de las actividades anuales que se realizan de manera conjunta familia-escuela, «Diccionario de Emociones» Se comprueba como los niños han realizado lazos afectivos con Emoti, que han facilitado la comprensión y asimilación de los contenidos. En todas las definiciones de este diccionario que realizan desde casa, observamos como nuestros alumnos en cada una de las fotografías están acompañados de Emoti en diferentes vivencias que nos muestran. Este lazo afectivo e interésque ha despertado este recurso pedagógico, ha sido imprescindible para dar significación y visibilidad a los contenidos de Educación Emocional quehemos trabajado. Por lo tanto Emoti como recurso pedagógico ha cumplido con creces sus objetivos, siendo un recurso de significación y disfrute para nuestros alumnos. Es necesario clarificar que el «espíritu» y «alma» de este recurso pedagógico está sustentado en la actitud y el rol del docente que lo maneja y utiliza como vehículo de aprendizaje emocional. Es importante que el docente disponga del convencimiento y la ilusión de hacer uso del mismo con el objetivo claro de conectarlo con el interés de los alumnos. Para ello tendrá que dotar a este recurso de «vida propia» en este sentido las propias historias trabajadas en el libro ilustrado "Emoti 4 clores 4 emociones", dotan al camaleón de vivencias propias, a la vez que las preferencias y pautas que Emoti les comparte y desde los conocimentos emocionales que van implícitos, que damos a conocer a los niños. Por estos motivos el docente debe de darle la importancia que merece, este recurso e hilo conductor de aprendizaje emocional, para que así lo perciban nuestros alumnos. Es preciso que el docente haga uso

de su formación en inteligencia emocional y la integre en su "saber pedagógico".

Por ello el programa incluye un curso de formación docente, que capacita para desarrollar la educación emocional en el aula.

Aludiendo a las palabras de Nolfa Ibáñez, Premio Nacional de Educación 2021.

> *Entendemos por saber pedagógico un corpus de conocimientos provenientes de distintas disciplinas, articulado por la comprensión de la relación dialógica entre teoría y práctica, asumiendo que el saber sobre cómo ocurre el aprendizaje constituye el punto central de ese corpus, en el cual destaca el rol de las emociones. Para la comprensión de los procesos involucrados en la construcción y reconstrucción del saber pedagógico…* (Ibáñez et al., 2008)

Ibáñez nos sitúa en un punto crucial para el aprendizaje emocional, la interacción con el alumno y los demás agentes implicados en la escuela. En este sentido se establece una fuerte relación entre la pedagogía del docente y la efectividad del aprendizaje de un programa de educación emocional.

3. Análisis del libro ilustrado

"Emoti 4 colores 4 emociones" ha sido el núcleo central del Programa. Cuenta con la Homologación de la Consejería de Educación como material curricular de uso docente en los centros educativos. Gracias a las cuatro historias que narra en sus cuentos, se han trabajado todos los objetivos planteados desde las actividades desde el conocimiento de las cuatro emociones básicas. Siendo un recurso imprescindible en Educación Infantil, nuestro libro ha cubierto funciones pedagógicas como, desarrollo de laimaginación del alumno de infantil que aún está anclado en el Egocentrismo y comienza a separar su «yo como centro del universo» y perfilar su identidad, las de los demás compañeros y personas de su entorno. A través de las distintas metodologías activas, que se emplean en los cuentos, como es el caso de «La respuesta empática» y «el abrazo» utilizadas para dar legitimidad a las emociones en un primer término, y para poder aprender a gestionarlas se les hacen llegar los aprendizajes emocionales. Y es a través de los recursos literarios que el libro incluye: canciones, poesías, diálogos, propuestas de resolución de conflictos, trabajo colaborativo, juegos, mucha comunicación y charlas entre iguales, se consiguen alcanzar los objetivos de aprendizaje emocional marcados.

Enlace del bock tráiler 2, del libro: https://youtu.be/yRWppkule84

4. El CD Emoti, álbum musical.

El aprendizaje multisensorial es una metodología científicamente contrastada, es necesario ofrecer al niño diferentes canales de aprendizaje que faciliten su adquisición. Es por ello que un programa Infantil debe incluir la Música como recurso auditivo, que incluye el aprendizaje emocional con metodología activa y lúdica. En el álbum de Emoti incluye las canciones de las cuatro emociones básicas que se trabajan. En el desarrollo anual del programa ha conseguido ser un recurso metodológico estrella con repercusión en el ámbito familiar, donde las familias han aprendido junto a sus hijos las letras y coreografías de las canciones, como lo han hecho llegar desde sus opiniones. Desde el inicio del desarrollo del Programa se establece el aprendizaje de lo que ha sido «el himno del Programa» la «Canción de la Alegría». Canción que nuestros alumnos aprenden bailando y cantando la letra con la Lengua de signos, haciendo de ella un material de inclusivo. Es imprescindible la utilización de la Música en Educación Infantil como vehículo de expresión y disfrute de nuestros alumnos, en este sentido el CD de EMOTI ha cubierto las expectativas. Difundir los contenidos de Inteligencia Emocional con las letras de las canciones e incluir la Alegría como estado emocional y clima óptimo del Programa. Se ha observado que a través de la expresión de la Lengua de signos nuestros alumnos han realizado un aprendizaje global de los contenidos ofrecido desde los «mensajes de regulación positiva de las emociones» que las canciones incluyen en sus letras, ya que es, a través del gesto y la psicomotricidad, como el cerebro infantil asimila los aprendizajes cognitivos sin dificultad. Llegando a la conclusión de que estos contenidos introducidos desde la música quedarán grabados en el Hipocampo de nuestros alumnos, siendo recuperados de su memoria sin esfuerzo, para con ello traer al presente los mensajes de Regulación Emocional que las canciones de este álbum musicalha introducido.

5. Análisis de los juegos de creación propia.

El Programa ha utilizado para desarrollar en los alumnos su Inteligencia Emocional dos metodologías lúdicas de uso inmediato. Se quiere destacar en la evaluación dos de los juegos llevados al aula, por haber conseguido su objetivo, un aprendizaje significativo a través de juego. Siendo «El dado de las emociones» y «Las cartas de las Emociones» entre otros… Ambos recursos lúdicos contienen pautas pedagógicas y metodológicas de uso, destacar como el contenido específico y mensaje: «Dejar la Rabia fuera de nuestros juegos» Se ha conseguido en un porcentaje muy elevado. Nuestros alumnos han sido dirigidos en estos dos juegos hacía la comprensión de que el juego, es una herramienta de diversión, lo cual significa «que sí no gano, no me enfado» ya que si lo hago dejaría entrar a la «Rabia e Ira » en mi juego, sabiendo que tanto la Rabia como la Ira son emociones desagradables, que disipan la Alegría de jugar y divertirse. Estas pautas de juego han conseguido, que nuestros alumnos no solo entiendan que enfadarse si no ganamos es perder la

diversión, si no que han conseguido llegar un paso más allá, «si no gano no me enfado y puedo continuar contento, si le doy la enhorabuena a los compañeros que han ganado…» ¡Bien hecho! Chocando sus manos y alegrándose por los demás…

De esta forma se ha analizado como los niños han asimilado que la finalidaddel juego en la diversión y lo el «ganar» dejando a un lado el alto grado de competitividad, sentando una bases de Gestión Y Regulación de las emociones de frustración, que en un futuro les condicionará para ser personas con Empatía, que resuelvan los conflictos de manera pacífica, al poseer una sana gestión de sus emociones y de la Frustración.

6. Boletín de evaluación individual de las competencias emocionales. La tabla de evaluación de actividad.

La evaluación del programa de Educación Emocional va a determinar el grado de consecución de los objetivos y nos va a permitir adaptar mejor la ayuda pedagógica a las características personales de los niños.

La subjetividad será un método de evaluación; la percepción del docente es muy determinante para saber cómo ha evolucionado el clima de relación de clase, el grado de satisfacción de los niños en las actividades y la utilidad de las mismas.

Es imprescindible recoger las apreciaciones y cuestionarios que les facilitaremos a las familias, que nos aportarán más datos para evaluar.

La observación, como bien es sabido por la comunidad docente, en especial en la Educación Infantil, será la técnica fundamental del proceso evaluativo. El educador, por medio de su interacción en las actividades y de manera personal con cada niño, recogerá una información que podrá ser reflejada por escrito.

Sin evaluación no se podría mejorar y seguir avanzando en la creación de nuevos objetivos que amplíen la instauración y desarrollo de la Educación Emocional.

Así lo fundamentan los autores de referencia Salovey y Mayer, desde su modelo basado en 4 ramas que definen 4 habilidades integrantes, que pueden ser evaluadas y nos dirán si una niño es una persona es hábil o no, en el ámbito emocional y afectivo, la mejor forma de hacerlo escomprobar sus habilidades a través de diferentes ejercicios que requieran poner a prueba tales habilidades, comparando posteriormente sus respuestas con criterios de recogida de datos que provengan de la observación y de las diferentes actividades planteadas en el aula, así como de los instrumentos cuantitativos de recogida de datos.

Atendiendo al proceso de evaluación que requiere el desarrollo de un programa, se recogen desde los dos instrumentos de evaluación directa dela adquisición de las competencias emocionales por parte del alumno. Un Boletín de evaluación individual de competencias emocionales, que recaba desde una escala Likert el nivel de adquisición de las competencias s de las IV Áreas emocionales y desde los objetivos específicos marcados en cada una de las actividades.

Y de la Tabla de evaluación de actividades, donde de manera cuantitativa y cualitativa se han recogido las observaciones del desarrollo de cada actividad, atendiendo a una escala Likert de 1-10 y evaluando los indicadores más importantes de consecución de objetivos: —Grado de satisfacción y placer. —Grado de implicación y participación. —Clima del grupo, escucha y asimilación. —Grado de obtención de objetivos de la actividad. Siendo una herramienta de obtención de impresiones inmediatas de la actividad desarrollada en el aula.

b) Análisis de la actuación docente del especialista, en el desarrollo del programa en las aulas

- La actuación docente ha sido determinarte, en este sentido la formación del docente como especialista en Inteligencia Emocional es imprescindible para el adecuado desarrollo de este ámbito del conocimiento, de esta metodología Pedagógica. Siendo indispensable una formación exigente que dote al docente de la actitud y bases de la Inteligencia Emocional que hagan de su discurso y planteamiento de aula, un vehículo óptimo de la consecución de los conocimientos, con garantía de ser los adecuados contando con el respeto absoluto de la integridad de nuestros alumnos. Para evaluar este punto tan importante como lo es «la actuación del docente especialista» nos remitimos a los datos objetivos y cuantitativos recogidos desde los «Cuestionarios del Observatorio de la Convivencia de la CARM» que se les realizaron tanto a todos los docentes implicados en los tres centros, donde ha discurrido el desarrollo del Programa. Los datos recabados son: Desde el «cuestionario a docentes» a la pregunta « Nivel de satisfacción con el pilotaje en el aula desarrollado por la especialista/responsable del Programa EMOTI»
- El 94 % de los docentes contestan estar muy satisfechos.

Para realizar la evaluación completa de la actuación docente desde la opinión de las familias, nos remitimos a las opiniones recogidas desde el «cuestionario de las familias» realizadas por los padres, madres y tutores de los alumnos, en puño y letra, que se encuentran en el punto 6. De este Dossier de evaluación.

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V. Modelo de Programa, Estructura y Actividades

a) Modelo de Programa

El Programa EMOTI de Inteligencia Emocional para Educación Infantil, responde a un «Modelo de Habilidades Emocionales y Cognitivas» acorde con desarrollo global del niño, como indica el Curriculum oficial de Etapa de Educación Infantil y primer curso de la Educación Primaria. Se atiende por tanto a una triple vertiente: Biológica, Psíquica y Socio- emocional, centrado en el desarrollo afectivo y de la personalidad del niño. El Programa atiende el aprendizaje emocional de manera global, lo que quiere decir, que no solo se conecta emoción-color. Es necesario hacer llegar al niño: vivencia que origina la emoción, somatización biológica-corporal, gestualidad, cambio de estado de ánimo, conducta que determina la emoción, estrategias de regulación emocional…

Apoyado en el modelo de Habilidades de Salovey y Mayer, siendo los autores de referencia de este programa. "la inteligencia emocional implica la capacidad para percibir, valorar, y expresar la emociones con exactitud, la capacidad para acceder o generar sentimientos que faciliten el pensamiento, la capacidad para comprender las emociones, y el conocimiento emocional; yla capacidad para regular las emociones promoviendo el crecimiento emocional e intelectual (Mayer y Salovey, 1997:10).

Reconociendo que las Habilidades Emocionales capacitarán al niño para la relación social sana y de respeto con sus iguales, para conocer, comprender y gestionar sus emociones y las de los demás, habilidades de empatía, de resolución ante los conflictos de manera constructiva y no violenta, tolerancia y regulación de la frustración, automotivación y valoración del buen humor, habilidad de trabajar cooperativamente, entre otras…«Niños con equilibrio emocional» Entendiendo que las Habilidades Cognitivas, implican la habilidad de tener en cuenta nuestras emociones en el momento en que razonamos o estamosresolviendo conflictos, enfocando la atención hacía la información que nos ofrecen las emociones.

b) Estructura

Se debe tener en cuenta que el desarrollo emocional en estas edades, 3-8 años, está vinculado a la evolución de la conciencia de sí mismo, y se tiene que atender al momento de egocentrismo que se encuentra el niño en esta etapa. Como docentes, utilizaremos las metodologías más adecuadas que nos aseguren el aprendizaje de todas las fases de la Inteligencia Emocional de una manera progresiva y paulatina.

Son cuatro las Áreas de Competencias en los que se divide el Programa creando con ello nuestro propio «Currículum emocional» que desarrolla de forma más amplia el Currículo oficial de Educación Infantil, en lo que al ámbito emocional se refiere.

De manera paulatina y progresiva, se trabajan las cuatro Áreas; por lo que no se abordará el área cuatro sin trabajar las anteriores, una, dos y tres.

Las primeras tres Áreas forman parte de las Competencias Intrapersonales (conocerse a sí mismo) y la última Área trabaja las Competencias Interpersonales (Conocer a los demás).

Cada área contiene 6-7 actividades, siendo de 25 actividades, más otras dos anuales. Por lo que hacen un total 27 actividades. En todas las Áreas se trabaja la Empatía, como eje transversal.

c) Puesta en Práctica de Las Actividades, Sugerencias y Ejemplos de Algunas de Ellas

Es conveniente que el docente utilice un lenguaje sencillo y breve para explicar las actividades al alumnado, promoviendo la reflexión al término de la actividad, ya que así evidenciará si los objetivos han sido interiorizados:

– Promover verbalmente la escucha activa entre el alumnado.
– Estimular la reflexión y el razonamiento.
– Identificar incidentes negativos sin entrar en acusaciones directas.
– Valorar verbalmente las conductas adecuadas a los objetivos, describiendo la acción.
– Promover la participación activa del alumnado adaptando el papel del docente al nivel de edad, con los niños de 3-4 años será un papel más colaborador y con los de 5 años más mediador.
– Prestaremos especial atención a los niños con N.E.E., motivados por los sabidos beneficios que la Educación Emocional les aporta.
– Utilizaremos los materiales pedagógicos creados para el Programa y los incluiremos en la decoración del aula.

Se aconseja que el educador disfrute también de todo el desarrollo de manera positiva para él, incluyéndose en el descubrimiento y aprendizaje de las emociones que su grupo-clase genere y desarrolle. Se persigue con ello, que el docente sea el motor de la buena gestión emocional.

i. *Ejemplos de algunas de las actividades familia-escuela*

A continuación se incluyen tres ejemplos resumidos, de las 27 actividades del Programa anual,

sabiendo que atienden a la estructura de: Introducción, Objetivos, Metodología, Adaptaciones, Recursos, Duración Y Orientaciones. Introducción:

* Actividad para realizar a lo largo del curso. Actividad extra. «Diccionario de emociones»

Esta actividad ayudará a los niños a ampliar su vocabulario emocional, con la ayuda y participación de las familias. Consiste en ir rellenando con las aportaciones de cada, alumno-familia, el "Diccionario de las Emociones" que viajará a las casas de las niños y tendrán que buscar y definir la palabra emocional que les haya tocado, acompañándolo de una representación plástica, artística…

- En esta actividad se trabajan las Inteligencias: Lingüística; Lógico- Matemática; Visual-espacial; Kinestésica-Corporal; Interpersonal; Intrapersonal; Naturalista.

Objetivo:

- Conocer la definición de las 4 emociones básicas y ampliar el lenguaje emocional con ayuda de la familia y utilizando diferentes recursos tecnológicos o no tecnológicos, como el diccionario, internet, revistas...

Metodología:

En una libreta de folios en blanco se pone la portada del "Diccionario de las Emociones" y en la siguiente página habrá una nota informativa dónde se les explicará a las familias el objetivo y desarrollo de la actividad.

Se trata de una actividad de investigación y en dicha nota habrá una relación de palabras emocionales. Por turno cada alumno se lo llevará casa y buscará la palabra emocional que le corresponda siguiendo el listado y la enumeración. Se podrá hacer la búsqueda con ayuda de su familia en internet, diccionario, revistas etc. Después se escribirá y acompañará la definición con un dibujo.

Se propone realizar un video informativo de la actividad, donde se exponga la definición de la emoción, vivencias en las que han podido sentirla e incluso recomendaciones de dicha emoción dirigida a los compañeros de clase. Este video será protagonizado por cualquier miembro del núcleo familiar junto con el niño. La duración de grabación audio-visual, no será superior a 3-4 minutos.

A la mañana siguiente se hará el visionado del video en el aula junto con todos los compañeros.

Se le explicará a la familia que le toque hacer la actividad, que es muy importante la participación activa del niño y la conversación familiar sobre la palabra emocional, repasando el concepto y comentando situaciones en la que se vivencia la palabra y cómo nos sentimos.

En esta actividad les acompañará a las casas EMOTI, así los alumnos irán motivados con su mascota y personaje principal de las emociones.

Al terminar la actividad los niños podrán disfrutar de un libro de consulta de emociones para tener en nuestra biblioteca del aula, a la vez que se habrá ampliado el vocabulario emocional.

Recursos:

- Libreta de folios en blanco.
- Portada "Diccionario de las Emociones"
- e-mail habilitado por el docente para la recogida de actividades audio- visuales elaboradas a lo largo del curso.
- Nota informativa dirigidas a las familias con listado de palabras emocionales, además de Tristeza, Rabia, Alegría y Miedo. (Se encuentran en Actividades Complementarias)

Duración:

Se pondrán tantas palabras emocionales como números de alumnos haya en clase, y de este modo se concluye el diccionario.

Orientaciones:

Las palabras emocionales son elegidas por la maestra, esto permite que se adapten al nivel educativo del aula. El comienzo de la realización del diccionario se aconseja, una vez terminado el Área I de competencias emocionales, para que los alumnos estén más preparados en contenidos y puedan realizar un aprendizaje significativo, ampliando su vocabulario emocional.

*Actividad 2.3. Del Área II. *Actividad familia-escuela. Título: ¿Quieres ver lo que sé hacer? Temática: ¡Confío en mí!*

Introducción:

Para potenciar en los alumnos su autoestima y confianza, es muy importante valorarles sus habilidades, capacidades y fortalezas. La imagen que el niño irá construyendo de sí mismo estará dictada por su auto- concepto (imagen física y de personalidad, real y positiva) y de su autoestima (aceptación y estima de él mismo). Es por tanto imprescindible ayudarles a construir unos cimientos de Gestión Emocional fuertes, que sustenten sus actuaciones futuras frente a la vida.

Objetivo:

– Saber valorar nuestras habilidades, fortalezas y potenciarlas.

Metodología:

Trabajo individual. Familia.

Para esta actividad necesitamos la ayuda de la familia. Habrá que enviarle una nota informativa aludiendo a las «Múltiples inteligencias» de Howard Gardner, incluida en su «Cuadernillo para familias» que se les entregó en la reunión de inicio de curso. Pretendiendo que sean conscientes de que sus hijos

pueden destacar en varias de las inteligencias. Por lo cual, deben potenciar una de ellas, en la que más destaque su hijo, y crear una representación para exponerla a sus compañeros de clase en directo o a través de un video grabado en casa.

Ej. Mi hija destaca en Inteligencia Viso-Espacial, por ello va a mostrar a sus compañeros un cuadro pintado por ella misma…

Mi hijo destaca en Inteligencia Naturalista, por lo tanto va a exponer a sus compañeros: cómo hacen la miel las abejas…

Actividad. 3.3. Del Área III Título: ¡Si no gano, no me enfado! Temática: ¡Ahora tú, ahora yo! Introducción

Introducción:

En estas edades los niños aún no han adquirido reglas de juego, es por ello que les resulta difícil controlar su impulsividad debido al momento de egocentrismo que atraviesan. El desarrollo socio-emocional les va a permitirdescentrarse de sí mismos y ser capaces de coordinar, manejar sus emociones y poder controlarlas. La Rabia es la emoción que más conductas disruptivas provocan, es necesario por tanto trabajar su control.

Objetivos:

- Controlar la frustración y la impulsividad y saber esperar lagratificación.
- Aprender a controlar la emoción de Rabia.

Metodología:

Gran grupo y parejas. «Dado de las emociones» Juego «Un abrazo al día me llena de Alegría» Y «Canción de la Rabia».

Para trabajar el primer objetivo marcado, es muy adecuado hacerlo a través de un «juego reglado». Para ello comenzaremos explicando que no siempre se gana, y que no debemos enfadarnos si no lo hacemos, si nos enfadamos la Rabia entra en nuestro juego y ya no es divertido jugar… (Utilizar a, para poner ejemplos) Para ello utilizaremos el «Dado de las emociones».

Cada grupo va a disponer de un dado, que cada niño tirará cuando le toque,y tendrá que levantarse y decir de manera oral qué emoción les ha tocado. Se premiarán entre ellos, realizando el Juego «Un abrazo al día me llena de Alegría» Terminaremos cantando la «Canción de la Rabia» y hablaremos del contenido de su letra, haciéndoles entender el mensaje positivo de control de la Rabia, que nos muestra la canción.

- Actividad propuesta para los tres niveles, 3-4-5 años. Para los niños de N.E.E. y los niños de tres años, adaptaremos el juego haciendo del proceso su finalidad, no la de ganar. La canción la cantaremos acompañada de mímica facial y corporal.

Orientaciones:

A la hora de introducir «juegos reglados» en la Etapa de la EducaciónInfantil debemos sentar las bases de la Regulación Emocional con respecto a la frustración. Muchos niños tienden a enfadarse, si no ganan o no se hace lo que ellos quieren. En este sentido se deberá crear un clima de juego positivo enfocado a la diversión y el aprendizaje, evitando la competitividad e individualismo negativo.

En esta actividad el uso de nuestra herramienta metodológica «La respuesta Empática» nos ayudará a controlar esos «Pequeños enfados» que experimentan los niños, al no controlar la frustración de perder. En este caso legitimar la emoción y manifestarles que es normal «enfadarse un poquito» hará que el niño nivele la emoción de la Rabia y, poco a poco, no muestre frustración ante circunstancias como perder en un juego.

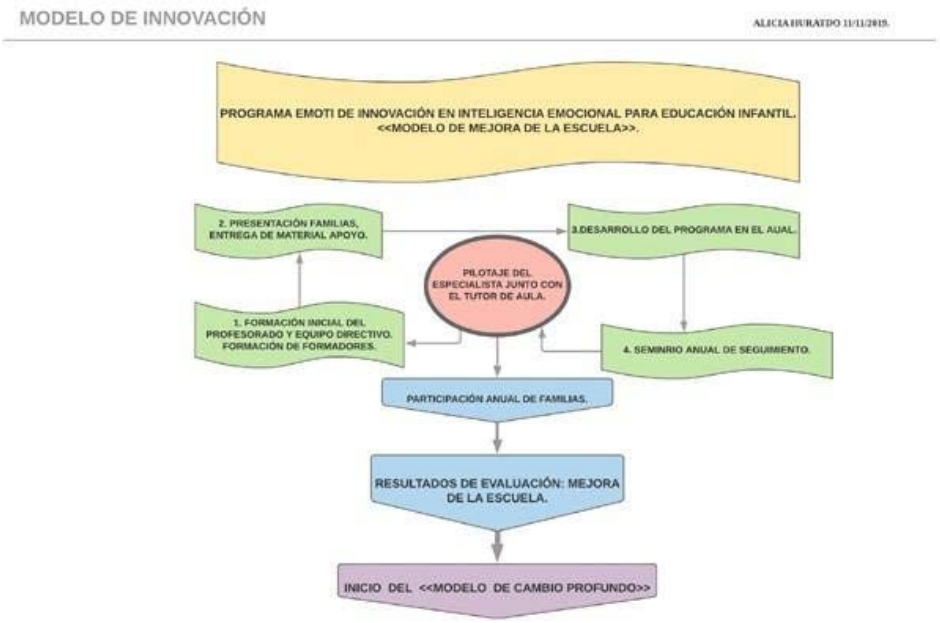
VI. Conclusión

Los datos recogidos en este Dossier de Evaluación, muestran el beneficio del desarrollo de la Inteligencia Emocional en el Ciclo de la Educación Infantil. Conociendo los datos que nos llegan de diferentes herramientas evaluativas, ámbitos y contextos de actuación y repercusión del desarrollo del Programa. Se incluyen cuestionarios para docentes y familias, y el boletín de evaluación individual del niño, y algunos de las actas elaboradas en las sesiones de seminarios de dirección y maestros, de acompañamiento al desarrollo del programa anual y observaciones de las actividades realizadas en el aula elaboradas por las tutoras. Adjuntos en anexos.

- Boletines de evaluación de los alumnos.
- Cuestionarios elaborados por el Observatorio de la Convivencia de la CARM, para docentes y familias.
- Observaciones del anecdotario del Programa, de las tutoras y especialista.
- Sesiones del Seminario de seguimiento del Programa Anual, dirigidas por la especialista, Alicia Hurtado, aprobados por el CPR (Centro de formación del Profesorado) de la CARM. De reflexión y ampliación a tiempo real de la experiencia de pilotaje en el aula.
- Tutorías con las familias implicadas.
- Entrevistas realizadas desde los medios de comunicación (Comarcal TV, periódico «La Verdad», Revistas locales…)

Por lo tanto la evaluación de un Programa debe de recabar tanto datos cuantitativos como cualitativos, los objetivos y los subjetivos, para exponer una evaluación global del ámbito de actuación de la experiencia. En el caso del Programa EMOTI es mucha la información obtenida y lo dispone a la sistematización de la experiencia como apto, para la Instauración del Programa EMOTI como material Curricular de uso docente en Inteligencia Emocional, en el Currículo oficial de la Educación Infantil.

Para determinar la efectividad de un Programa educativo es recomendable ynecesario poder llegar a una evaluación profunda que nos permita ver la identidad del programa dentro de la clasificación académica de los tipos de programas según sus características más definidas. Es por ello que habiendo analizado la experiencia de innovación del Programa Anual EMOTI, se considera un «Modelo de mejora de la Escuela» Según Earl y Lee (1998) Este proyecto se basa en la intensa participación y colaboración en la escuela: docentes, familias, comunidad, estudiantes y de la administración junto a colaboradores externos. Atendiendo a estas premisas se elabora el esquema de actuación del Programa Anual Emoti, utilizado en la experienciade pilotaje del curso 2018/19. Clasificando al Programa como un «Modelo de mejora de la escuela» que abre paso con su instauración en el Currículo Oficial de la Educación Infantil, al «Modelo de Cambio Profundo» (Senge 2004,2014) que proyecta a los programas que trascienden en su intención educativa desde la mejora de del contexto, junto con las competencias desarrolladas en los alumnos, incidencia en los contextos, y evidenciar que la Innovación se ha realizado apoyándose en los resultados alcanzados.



Así evocando palabras de (Senge, 2004, 2014) El cambio sólo es profundo si se apoya en procesos de refuerzo que lo consoliden, se necesitan nuevas reflexiones y teorizaciones que justifiquen los cambios a asumir y el desarrollo de tales innovaciones, atrayendo a destacados agentes que a su vez impulsarán, dado que las innovaciones se consolidan con riesgo ydespués de numerosos intentos. Hemos de contextualizar e identificarlascon claridad y rigor, ya que numerosas difícilmente se incorporan a la cultura, si no son aceptadas por todos los miembros de la organización, dado que numerosas brillantes ideas no se trasladan a la práctica, porque son percibidas como poco innovadoras y otras veces por ser claramente desestabilizadoras «Se desea por tanto que el arduo trabajo de desarrollo, evaluación e investigación realizado con el Programa EMOTI, en el curso 2018/19 como experiencia de Pilotaje en Inteligencia Emocional pionera en España, siente el precedente positivo que consiga implementar esta pedagogía y ámbito del conocimiento, que sin duda otorgará a nuestra Educación un rango de ser global e integral, y por consiguiente se sumen sus beneficios al Sistema Educativo Nacional» A. Hurtado.

En la actualidad en este año escolar 2021 el Programa EMOTI está siendo editado de nuevo, introduciendo las orientaciones pedagógicas y didácticas que han surgido de la experiencia de su desarrollo en estos últimos años. Introduciendo propuestas de innovación de la práctica de la educaciónemocional, que faciliten la actuación docente y la efectividad de la aplicación del programa. Con el objetivo de favorecer la adquisición de las competencias en los alumnos.

Muchas gracias por todo el interés y satisfacción que docentes y familias han compartido con la pedagogía EMOTI, es mi deseo mostrar toda mi gratitud. Alicia Hurtado.

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Anexos

CUESTIONARIO "PROGRAMA ANUAL EMOTI DE INTELIGENCIA EMOCIONAL"

Familiares

Centro educativo: _____
Relación con el alumno/a: _____
Año de nacimiento: _____
A continuación valore las siguientes cuestiones, entendiendo: nivel bajo 1; nivel medio 3, nivel alto 5.
INSTRUCCIONES: Marque con una X sobre la opción ELEGIDA

Nivel previo de conocimiento de inteligencia emocional antes de comenzar eldesarrollo del Programa EMOTI.	1	3	5
Nivel de satisfacción con la información ofrecida en las reuniones y en el"Cuadernillo para familias" en el desarrollo del Programa EMOTI.	1	3	5
Nivel de colaboración familia-escuela en las actividades propuestas por el ProgramaEMOTI.	1	3	5
Nivel de satisfacción con las actividades propuestas familia-escuela por el ProgramaEMOTI.	1	3	5
Nivel de participación y aprovechamiento observado en su hijo/a, al final deldesarrollo del Programa EMOTI.	1	3	5
Nivel de aprendizaje de su hijo/a de contenidos de inteligencia emocionaltrabajados en el Programa EMOTI.	1	3	5
Nivel de evolución observado en la conducta, en el conocimiento de la existencia y en la regulación de las emociones de su hijo/a después de participar en el ProgramaEMOTI.	1	3	5
Nos gustaría que compartiera con nosotros su opinión y propuestas de mejora, para ello, le invitamos a que nos escriba al respecto de la experiencia vivida durante el desarrollo del Programa EMOTI. (Utiliceel reverso del folio.)			

"Gracias por su colaboración"

CUESTIONARIO "PROGRAMA ANUAL EMOTI DE INTELIGENCIA EMOCIONAL"

Docentes

Centro:_____**Cu**

Sexo: Hombre ( ) Mujer ( ) Edad: _____

Años de experiencia profesional: _____

Etapa educativa: EDUCACIÓN INFANTIL

A continuación valore las siguientes cuestiones, entendiendo: nivel bajo 1; nivel medio 3, nivel alto 5.

INSTRUCCIONES: Marque una X sobre la opción ELEGIDA

Nivel de conocimiento del desarrollo de la Inteligencia Emocional en el ámbito educativo, antes de comenzar el desarrollo del Programa EMOTI.	1	3	5
Prioridad que le daría usted al incluir la Educación Emocional en las aulas en el ciclo de Educación Infantil atendiendo al desarrollo integral del niño.	1	3	5
Nivel de satisfacción con la formación previa al desarrollo del Programa EMOTI	1	3	5
Nivel de satisfacción con el pilotaje en el aula desarrollado por la especialista/responsable del Programa EMOTI.	1	3	5
Nivel de satisfacción con la consecución de las cuatro áreas de competencias emocionales trabajadas con su alumnado con el apoyo del Programa EMOTI	1	3	5
Nivel de participación y aprovechamiento de las sesiones del Programa EMOTI por parte de su alumnado.	1	3	5
Nivel de adquisición de los contenidos de inteligencia emocional abordados en el Programa EMOTI y adquisición las competencias trabajadas.	1	3	5
Nivel de evolución observada en la conducta, clima de clase y mejora de las relaciones entre el alumnado después de cursar el Programa EMOTI.	1	3	5
Nivel de aprendizaje y concienciación del alumnado de la existencia de las emociones, de cuáles son sus funciones y regulación de las mismas, después de cursar el programa EMOTI.	1	3	5
Nivel de satisfacción, interés y participación que han mostrado las familias en el desarrollo del programa EMOTI.	1	3	5
Nos gustaría que compartiera con nosotros su opinión y propuestas de mejora, para ello, le invitamos a que nos escriba al respecto de la experiencia vivida durante el desarrollo del Programa EMOTI. (Utilice el reverso del folio.)			

"Gracias por su colaboración"

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The Gatekeepers

By Donna Robinson Divine

Abstract- "The Gatekeepers" describes the reaction of a handful of well established Israel Studies scholars to a special issue of the journal Israel Studies called "Word Crimes: Reclaining the Language of the Israeli-Palestinian Conflict". These professors preferred to denounce rather than engage with the arguments and analyses presented in the special issue deploying their authority to try to silence this challenge to the conventional discourse on the Middle East Conflict.

Keywords: word crimes, israeli-palestinian conflict, academic discourse, settler colonialism, imperialism, Zionism.

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The Gatekeepers

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Introduction

Published in April 2019, the Special Issue of *Israel Studies* hit a nerve so raw it still tingles online journals and newspapers. As one of the co-editors who conceived the project which has come to be known as *Word Crimes: Reclaiming the Language of the Israeli-Palestinian Conflict*, I am flattered by the attention but troubled that the argument it advances has been ignored by so many.[1] Because a handful of established scholars seemingly preferred to denounce rather than engage with the issues raised in this volume, they effectively ended up grafting a level of legitimacy on the highly flawed discourse the Special Issue examined. One might well ask why an exploration and deconstruction of a discourse would elicit such blasts of hostility against the project and so unabashedly mete out savage insults to its contributors.

Word Crimes is meant to examine the linkage between language and thought – long a staple of philosophical inquiry[2] and to ask whether deploying terms like genocide or apartheid offers a genuine understanding of the complexities of the Conflict. It aims to call attention to how certain words and ideas have begun to settle into a public discourse and to take the measure of the consequences for the academic study of Israel, of Palestinians, of the Conflict and not incidentally, of politics. The politics propagated by this discourse is binary–fit into good or bad rubrics that appeal to feelings not into categories that show the way power is actually wielded. Identifying the words that have become the central elements in this discourse, the volume shows how a lexical transformation has acquired a totemic standing in the academy and is spreading beyond campus perimeters with a momentum augmented in an increasingly networked world. *Word Crimes* focuses on terms because they function much like oracles coaxing judgements in the absence of evidence so long as Israel is assigned to a rhetorical zone once reserved for brutal regimes committing ghastly crimes. Events are pigeonholed into moral absolutes that appeal to emotions or to a larger ideological agenda and not to an accurate depiction of the issues and of the reasons for the persistence of the Israeli-Palestinian Conflict.

Word Crimes stirred up a powerful anger provoking a sense of righteousness but not a clarity of thought. From the moment it was posted online, alarm was sounded when people saw only the title and table of contents. One person expressed shock at 'the inflammatory and demonizing title' while another asked 'who are exactly the criminals and what should their punishment be?'[3] – all on open access listservs where rage accumulated and quickly catalysed into charges that the Special Issue compromised the intellectual status of the Journal and of the Association for Israel Studies because of the Journal's loose relationship with it. In fact, this one Special Issue was said to have the potential to wreak havoc with the entire field of Israel Studies.

Much of the anger was directed at me because at the time, I served as both President of the Association for Israel Studies and one of the editors of *Word Crimes*. Every comment I issued, as one of the volume's editors, was construed as an official statement of the Association inevitably restraining them. I completed my term of office in June 2019, and for that reason, I am no longer constrained in what I can say. Moreover, I am convinced that there is more to say particularly about the factors promoting, if not causing, the uproar. Ironically, the reactions, with their remarkably formulaic denunciations, were filtered through the very template *Word Crimes* interrogated. Critics dismissed *Word Crimes* characterising it as a species of Israeli government propaganda. Rating a project as failing to meet minimal academic standards without offering credible evidence is, itself, so transgressive of academic norms that it ought to be the focus for close examination particular since the project was clearly intended to open not close down discussion. But before scrutinising the reaction, let me review the reasons we – the editors and contributors – decided to subject what is becoming a common discourse on the Israeli-Palestinian Conflict to sustained analysis and to do so, by examining its linguistic parts.

I. The Special Issue

As much as the essays in the collection are about words, they are also about history and politics.

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The first section focuses on terms–indigeneity, colonialism, occupation, terrorism, and apartheid – that claim to disclose new aspects of the Conflict's history and of the mechanisms deployed to perpetuate it. It is worthwhile to note that utilising these terms as historical paradigms has generated no new data or information that could be the basis for a new or deeper understanding of the Conflict. Rather they have seized attention because they propel a supposed link between Israel and Zionism and an imperialism enlightened scholars are expected to condemn instantly converting a vocabulary of historical explanation into a crude moral idiom. The Special Issue's second section focuses on terms coopted from the modern Jewish experience – holocaust, refugee, human rights, Zionism, and Israel Lobby – to show how they have been projected on to the experience of Palestinians in order to transfer the imaginative narrative of one beleaguered people to another. Finally, the volume evaluates concepts that are decidedly post-modern inventions – Islamophobia, intersectionality, pink washing. These trendy terms aim to rally allies around a new logic of ethical reasoning and political action. The last essay in the volume addresses the contorted reasoning required to apply the pivotal concept 'civil society'–taken for granted as expanding democracies in the late twentieth century–to NGOs whose actions are not simply funded but also programmed by foreign governments and whose ties to movements thriving on acts of terror are well-known and well-documented. Such linkages are more likely to deny than preserve the autonomy believed central to civil society and to democracy diminishing not expanding a spirit of active political engagement among Palestinians.

This academic jargon now so fully draped in scholarly prestige implies that Israel's founding in 1948 is not settled history. The intention is not simply to raise ethical questions but also to suggest the possibility of righting what is taken for granted as an historical wrong. Those who subscribe to this approach are not talking about historical facts that continue to weigh heavily on present circumstances which is to say the persistence of Israel's unresolved conflicts with Palestinians, problems that affect the Jewish state's politics and complicate the operations of its democracy. The implication that shadows this discourse is that history can be reversed registering a kind of magical thinking more fit for novels than for classrooms. More than 70 years since its founding and more than a half century since the war that reconfigured the Jewish state and not incidentally, the entire Middle East, raising the same questions posed during the first decades of the twentieth century opens a chasm between language and reality.

Driving this change, as all others on and off campuses, is the emergence of a new media landscape that has offered scholars new forms of expression. Blogging and tweeting are increasingly important–signs of savvy entrepreneurship bringing publicity most colleges and universities welcome. But they can blur the lines between free speech and the kind of speech possessing academic integrity that expresses the findings of careful research, logical and rational probing, and is made available for rigorous testing. Once there was a clear differentiation between polemics and scholarship; now the two have been fused sometimes by jargon laden theories inaccessible to anyone without years of graduate study. All of this fosters a social pressure that aims to close discussion, not open it, but above all, creates the impression that only a campus generated Intifada against the idea of a Jewish state can bring justice to Palestine and define progressive politics in the twenty-first century. The challenges posed by students and faculty who embrace these notions are considerable, but they constitute a more immediate threat to the academy than to Israel. Faculty need to be reminded that their mission is to teach students how to think not what to think. And students must be given the tools required for confronting ideas they do not like or that make them uncomfortable, always holding them tightly to the principle of engaging respectfully with those with whom they disagree. That surely means more time should be spent in the library than in sessions organising protests. Far better to read about the Dark Ages than to recreate them on campus.

Word Crimes offers potent insight into the difference between how language operates as an echo chamber advocating a mission and how it functions when it strives for exactitude and for a reliable assessment of a complex situation. In a sense, *Word Crimes* functions as a figurative exorcism breaking the spell of a discourse by exposing its scholarly weaknesses. Its essays are motivated by nothing more than the conviction that conclusions must be supported by facts and tested in accordance with the principles long undergirding the academy and the ones primarily responsible for bestowing legitimate praise and power on it. To repeat: this collection is as important for the academy as it is for the study of the Israeli-Palestine Conflict.

II. The Uproar

The all-too common habit of letting emotions shape campus discourse on this topic produced reactions to *Word Crimes* far in excess of what is warranted by any measurable intellectual standard. Why scholars whose hold on the academic study of Israel is taken for granted and whose research was praised in the volume allowed their feelings to bury their logic is worth considering since their own careful work has been diminished by a vocabulary now serving a cause rather than the historical record. Let me elaborate. Consider how the provocative discussions of settler colonialism generated by Gershon Shafir's 1989 *Land, Labour, and the Origins of the Israeli-Palestinian Conflict, 1882–*

1914[4] advanced discussions of the relationship between land and nationalism even as it sparked investigations of the many contradictions between Zionism and other settler colonial societies.

Then ponder the current branding of Israel as a settler colonial society that has had such a catalytic effect on destroying the idea of a legitimate Jewish state whatever its borders or policies. A settler-colonialist Israel delivers up a Jewish state that presumably developed a rationale adequate to justify the use of force not in order to survive or to place moral restraints on its use but rather to mask its atrocities. Building its claims on the idea that the plough is no less an instrument of violence than the sword, the settler colonial paradigm means that Israel, by its very nature, is a country engaged in an ethnic cleansing with genocidal tendencies, a disciplined criminal action by Jews to wipe out of existence a people whose nationalist ambitions stand in their way.[5]

That scholars who judged the special issue a badge of shame simply for tackling a discourse so clearly contaminated by politics stoked the rage and drummed it up until it drew media attention and became a matter of public debate suggest how beholden leaders in this field are to a hermetic so-called progressive view of this Conflict. Some resigned from the *Israel Studies* editorial board to demonstrate the depth of their opposition to *Word Crimes* calling public attention to their opposition by granting interviews in mainstream media outlets. Some took to social media to weave a tale valorising all sorts of disinformation while pulling no punches or adhering to no recognisable standards. Denouncing the essays rather than engaging with the arguments violated what was once a foundational educational value: that the purpose of scholarship is to investigate that which is taken for granted. Dismissing the essays also allowed people to avoid having to think about where their own academic politics are taking the study of Israel. No surprise that in these overheated reactions, there was more than a hint that the field of Israel Studies has to adopt language acceptable to BDS proponents to prove its bona fides. Condemning *Word Crimes* as 'Orwellian' may, perhaps, be best understood as an illustration of a collective Freudian projection.

Denunciations so promiscuously pitched over social media limit access and/or insight into the thinking behind these views. But the letter of resignation written and signed by some members of the Journal's editorial advisory board, the unmonitored and open listservs that triggered alarm against *Word Crimes*, newspaper articles, and petitions all discredited the Special Issue and maligned the people who put it together in remarkably similar language quickly translated into sound bites.[6]

The letter of resignation listed a series of demands – they turned out to be ultimatums – intended to repair what was viewed as a flawed review process responsible for an issue dismissed as advocacy. But the charges forming the reasons for their resignation not only lacked coherence they also, if true, argued for remaining on the Board if only to safeguard its intellectual quality going forward. *Word Crimes* was the eighteenth special issue of *Israel Studies*, the first to elicit this kind of opposition and raise questions about the review process. Opponents demanded new procedures that would give the editorial board a well-defined role in determining the content and topic for future issues. Although the general editors acknowledged flaws in the editorial process, promised to provide space in future issues to publish critiques of the project or of individual essays, and establish more editorial controls over special issues, they refused to withdraw the issue from circulation or commit to a plan for their own resignations thus failing to satisfy the critics.

Even conceding the validity of some of the demands, why should they form the basis for a reckoning over the Journal's status or the integrity of its leadership grave enough to propel resignations? This is a journal that has published hundreds of controversial articles over many years without provoking an outcry. Furthermore, why did the editorial board members who resigned insist their letter be published in the Journal? Why was it necessary to impeach the scholarly credentials of the volume's contributors while aiming implied threats at younger scholars? Underscoring their Olympian university status, the critics seemed to want their letter to be taken as a manifesto of their intellectual integrity and not incidentally of their presumed command over the academic standards in the field of Israel Studies. To achieve these objectives, they essentially set up a petri-dish environment on open listservs that quickly leached into social media sites bulldozing any meaningful discussion of the volume or of the issues it addresses.

Fierce criticism initially hurled by people who admitted to simply browsing the titles later insisted that reading the essays had not altered their views. Contributors were said to have produced sub-par work and dismissed as 'light-weight'. The reputation of the editors was smeared as having practiced deception in the review process or perhaps having paid to ensure publication in an attempt to hijack the Journal for some powerful advocacy force lurking behind this project. That this was damaging to a group of scholars – including people in the junior ranks–is as obvious as it is shameful. There are established ways to launch critiques in peer-reviewed journals. Sadly, the kind of rhetoric on display over this special issue was not even close to following established norms. Choosing Facebook as the platform to incite opposition to the Special Issue and gather names for petitions sent spinning through cyberspace and then picked up by

various news outlets was designed, as is often the case with social media, not for accuracy – the posts and petitions are filled with misstatements – but rather for maximum humiliation. The tone on social media even exhibited an eagerness to serve up bogus accusations of racism, accompanied by the kind of fervour for enemies likely found on the streets of Paris in 1789.

The essays in *Word Crimes* are no summons for a restoration of the heroic myths of founding the Jewish state; they are, rather, a plea for a return to the library, to the archives, and to the painstaking research that has liberated scholars from subscribing to a simple narrative of the country's state-building experiences as fulfiling only a progressive national mission. Many newly minted Israeli academicians – some calling themselves new historians, others critical sociologists – probed the Zionist nation-building project by examining its impact on Palestine's Arab population, Middle Eastern immigrants, and on the lives and experiences of women without guidance from a politicised vocabulary that is more a reflection of our own times than of the reality of times past.

While *Word Crimes* addresses the scholarly community, it also attempts to reach beyond the gates of the University and its Israel Studies scholars by providing short accessible thought pieces: some essays present fully researched arguments; some gesture towards the larger critical narrative presented. Writers as well as policymakers were invited to join the project. The editing was 'light' because the contributors held a variety of views, and it was thought preferable to let their very brief essays speak for themselves. The intention was to widen not narrow the discussion. The notion that people should not write on topics normally outside of their own disciplinary training – as the petitions assert–is simply a way to avoid tackling the serious issues the essays raise. It is also a strange view coming from a field that combines varying disciplines and training and is a purported exemplar of what interdisciplinarity can achieve. By no means intended to provide the final word on the topic but rather to broaden the conversation by including new kinds of participants holding diverse perspectives, the collection brought together something rarely done in these times–people who are located on all points of the political spectrum.

The charge that the essays comprise a dictionary of acceptable terms is as false as it is ridiculous. There is a distinction between arguing certain words channel thoughts in one direction, on the one hand, and calling for a ban on their use, on the other. Rather than stipulate a set of acceptable terms, the essays weave a cautionary tale of how certain words now deployed routinely in discussing the Israeli-Palestinian Conflict are more polemical than accurately reflective of developments. In the Introduction, I offered some examples. I did not take a position on whether what happened at Deir Yassin should or should not be called a massacre. I thought it significant that a publisher had rejected a manuscript on the killings not because it failed on empirical or logical grounds but rather because it was deemed unfit for an English-speaking audience.[7] Similarly, the prize awarded to a tendentious book charging Israel with harvesting organs of Palestinians is, I argued, an illustration of how degraded academic standards have become because the research is filled with errors easily dispelled by a simple Google search.[8] Finally, I tried to show that this language also prevents a deep understanding of Palestinian history and politics by presuming that Israel exercises total control over the lives of Palestinians according them no 'agency' or capacity to change 'Ha-Matzav'. [The Situation] The notion embraced by Palestinians of an all-powerful Zionism can be found in Arabic texts even in the early days of the Zionist project when Zionism had very little power and an insignificant global presence.[9] This is not to celebrate the Occupation but rather to argue that to end it requires considering more than simply Israel's policies and actions.

Today much of the academic discourse on the Middle East Conflict has distorted the truth by transforming even the very idea of what constitutes a 'fact'. 'Facts' are stitched into a narrative often to effect loyalty rather than to verify assertions. This presumed intractable conflict over land has been substantially reconceived as a war over words. And although the hegemonic discourse claims to be opening up new and better ways of understanding the Conflict, it has had a profound impact on closing down the possibility of following the best available evidence. An academic perspective, now expected to guide action and render moral judgements, cannot serve as a robust agenda for research.

The ironies produced by this new set of terms for the Conflict abound. Take, for example, the current language of human rights whose gravitational pull now denies Israel the blessings it once conferred on the establishment of a Jewish state as advancing the cause for justice. Thus is Zionism, more judged than understood, condemned as racist. The esteem bestowed on words and deeds associated with the Israeli-Palestinian Conflict is a function of their capacity not to promote peace, coexistence, or reconciliation but rather to signal affinity with a global progressive politics.

To read newspapers and magazine articles on the Israeli-Palestinian Conflict, to watch the violence broadcast on cable news or to toggle through social media for information is to be bombarded by negative images of Israel and on more than one occasion of Jews. How an attack is initially framed, of course, gives it disproportionate influence on how it will be remembered. Reporters, fumbling their way through

platitudes, produce a script rather than an analysis. There is a power attributed to the right words in the right order or captured at the right angle for YouTube.

If the narrative amplifies sentiments in American culture that foster sympathy with the poor and powerless, it is accepted turning unverified pronouncements into unverified reports that ignore or omit the dynamics explaining the vector of developments. Echoes of pain and loss can carry a narrative across oceans and continents drawing false analogies between disparate groups or movements or histories that may expand allies but do nothing to deepen understanding of what caused their suffering and dislocation. The acrobatic logic interweaves fact and fiction spinning elaborate associative webs that deploy metaphors to fashion linkages between people, politics, and history with nothing in common except their calls for a reckoning with the powers presumably denying them justice.

III. Petition

The Petition sent to the AIS Board offers the clearest illustration of the overwrought and incoherent reaction to *Word Crimes*. Drafted by Yair Wallach, Pears Lecturer in Israeli Studies, at SOAS, University of London, the Petition objects to the title and to the Introduction's vocabulary alleging both are designed to shut down debate by 'criminalizing' it. Mistakenly declaring the Association for Israel Studies to be the Journal's sponsor,[10] the Petition calls on the Association to recommit to the principle of intellectual diversity. This presumed peril to intellectual diversity is compounded, according to press interviews, by my serving simultaneously as an editor of *Word Crimes* and as AIS President.[11]

An impressive 200 people signed the Petition addressed to AIS. Interestingly, most are not AIS members – nor is Dr. Wallach–and many are well-known proponents of a boycott of Israeli educational institutions. But among the AIS members who signed the Petition concerned with a commitment to intellectual diversity were scholars who had served on the Association's Board–or even as its officers–or who were invited to join the Board or to become an officer. Some had won AIS awards for their work, and a large number had received grants enabling them to participate in national conferences. The 2019 Conference Programme provided further evidence of the diversity of perspectives on almost every one of its pages, and it is one that I not only applaud, it is also one that I actively encouraged as co-chair of the Conference and President of AIS. It is difficult to imagine stronger proof of an unshakeable AIS commitment to intellectual diversity. Torn between readily available 'evidence' and 'outrage,' Petition supporters appear to have rejected the easily substantiated former in order to manufacture a rage around the latter falsehood that the publication of *Word Crimes* jeopardised the core academic ideal of intellectual diversity in AIS and in *Israel Studies*. It is striking to have to remind established scholars that protecting intellectual diversity also demands shielding minority views – or what might be called fresh perspectives–from being trampled by majorities or by those, however small in number, who consider themselves entitled to define the borders of acceptable discourse.

The Petition directed to AIS is riddled with errors but none so glaring as the meaning attributed to the title and to some of the words in the Introduction. No less an authority than Merriam-Webster lists 'mistake' as one of the definitions for 'crime' and suggests 'sanity' – another word flagged in the Petition–as a synonym for 'rationality' and 'balance'. Just as an aside, Merriam-Webster won its status in the nineteenth century in what a recently published book by Princeton University Press calls *Dictionary Wars*.[12] The English language has much more depth and flexibility than is acknowledged in the Petition.

The notion that as AIS President, I should not have published something as controversial as *Word Crimes* deserves added comment because it echoes statements from AIS colleagues who did not put their words into print. Let me begin by stating the obvious; namely, that I did not identify myself as AIS President in the publication but rather as Professor Emerita of Smith College. But if Association officers cannot compartmentalise their activities, it is necessary to ask how an injunction against publishing something that sparks controversy might be enforced? I was surprised by the reactions to the Special Issue since I have published articles and books for the past forty years without triggering much notice let alone dissent. Moreover, if officers are not allowed to publish during their terms of service, doesn't such a ban compromise their academic freedom or even their fundamental rights? Is there any credible academic association that imposes such stringent rules on its officers?

It stretches the term irony beyond recognition to point out that the very people asking for assurances critical discussions will continue both in the Association for Israel Studies and between the covers of *Israel Studies* are the very people refusing to engage in an intellectual exchange with the arguments set out in *Word Crimes*. Instead, they have sought to 'deplatform' or 'cancel' people associated with the Special Issue from conferences, doubling down on the insidious and untrue accusations originally served up on various listservs. Of course, given the times and the circumstances, it was also inevitable that the people who wrote and circulated the petition ramped up their smears on social media until *Word Crimes* was brought into the orbit of racism and of the so-called unprecedented dangers to democracy unfolding in the last decades in Israel and the United States. Any literate person – let alone

someone possessing a Phd – should be able to see that *Word Crimes* had nothing to do with elections in either Israel or the United States or with government policies formed in either country. Not to put too fine a point on all of the allegations undergirding this controversy, they are as false as they are hollow.

The problem of narratives about Israel and the Conflict is that they angrily feed off one another, as symbols grasped by partisans for one cause or another. *Word Crimes* argues for an alternative–not a consensus on causes or resolutions–but rather for a reasoned dialogue about these differences and a serious probing of concrete evidence. Imagine, if you can, a response to the publication offering an analysis of the conceptual or empirical flaws of the overall argument or of one or another of the specific essays instead of the assault on the academic status of the Journal and on the intellectual integrity of those involved in this special issue. Needless to say, a more cordial exchange could have produced a more reasoned testing of arguments. In a genuine academic community, intellectuals do not try to silence or 'troll' one another but rather to talk despite their differences even with no other aim than to display the grounds of their diversity.

IV. Conclusion

If *Word Crimes* is so obviously a flawed project, it could easily have been ignored or criticised. Instead it has been cast into what Gershon Shafir calls 'the current Israeli context in which academic and artistic freedom are besieged … . [and where] Israel today is on an accelerating course of undermining the protections of its democracy within the Green Line and is one of the many countries turning into illiberal democracies.' Shafir goes on to argue that 'the term "word crimes" doesn't stand alone but is of a piece with the proposed code of ethics and law for loyalty in culture.'[13]

There is every reason to believe Gershon Shafir represents the views of the people who resigned from the Journal's Editorial Board since they were happy to accept his offer to edit another Special Issue of *Israel Studies* devoted to a critique of *Word Crimes*. But if *Word Crimes* can only be grasped in the context of political developments in Israel, then it seems only fair to mention that the past two presidents of the Association for Israel Studies [and coincidentally one general editor of the Journal and one of the Special Issue] wrote letters raising objections to the passage of the Ethics Code and the Entry Law. Leaving aside the uncomfortable fact that there is no material connection between *Word Crimes* contributors and these particular policies, we must ask what is achieved by joining them together and explaining one as a manifestation of the larger forces animating the other? At the very least, to assume everything a function of politics clarifies the stakes for the academy. On the one hand, there is an orthodoxy on politics as well as on language illustrated by Gershon Shafir's critique, and on the other, as demonstrated in *Word Crimes*, a commitment to open inquiry with nothing above or outside of the range for investigation and where no vocabulary is absolutely sovereign. Words can always be tested to determine whether they expand or contract knowledge? And while the feelings stirred up by the conflict between Palestinians and Israelis are so deeply held that, examining it without taking sides is difficult, if the terrible toll exacted by this hundred years' war commands only political advocacy, then the academy, itself, is likely to become one of its casualties.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes

1. The online Journal *Fathom* stands as an exception publishing a long review of the issue by Cary Nelson [May 2019] followed by a symposium including an essay by Gershon Shafir explaining his objects and responses from editors and contributors to Shafir's essay [July 2019]. Tobin's article, "Is There Room In The Academy for Honest Scholarship on Israel?", in *Jewish News Service* on May 17, 2019 is also an example of reporting that shows understanding of the academic process.
2. See Plato, *Republic*, Book VIII; Arendt, *Origins of Totalitarianism*; and Orwell, *1984*.
3. Later repeated in newspaper articles. See Jonathan Tobin, *op. cit.*
4. Shafir, *Land, Labour and The Origins of the Israeli-Palestinian*.
5. Moses, ed., *Empire, Colony, and Subaltern Resistance*.
6. Arie Dubnov, Max Ticktin Chair of Israel Studies, Associate Professor of History, The George Washington University, ventilated many of the concerns about the Special Issue in emails and on his Facebook page where he provided links to the petitions and stoked the anger while spreading misinformation. In one of his emails, he wrote that because of the damage done by the Special Issue 'to the institutional reputation of the AIS and even to the field of Israel Studies more generally,' he decided to reject the Young Scholar Award – a joint AIS-Israel Institute prize. He apparently never gave much thought to the collateral damage such a public rejection might inflict on future funding for other academicians. He also refused an invitation to serve on AIS's Board because of what he incorrectly called the organisation's 'sponsorship' of the Journal. Claiming to be a firm believer in rigorous empirically based scholarship, he went on to accuse the past and current AIS Presidents of some sort of cabal in service of Israeli propaganda

interests – a charge without merit or evidence. Critiques of BDS function as a litmus test for Dubnov [See his review of Colin Schindler's *Republica Hebraeorum* in *Israel Studies Review* [Winter 2017]: 32 2. 164–170 where he hurls the same charge against Schindler.] He appears to dismiss the notion that one can oppose boycotting Israel on educational grounds. As an Israeli teaching in the United States, Dubnov seems not to have considered how the boycott movement may prevent young scholars from spending time in Israel in order to gain fluency in Hebrew or access to archives for research. The more boycott demands are met the more likely grants for studying in Israel will be reduced.

7. Elman provides a good summary of the publishers' reactions in her essay, "Silencing History."
8. Berger, "Academic Prize for Scholarly Form of Blood Libel". Berger Writes, "Even amidst the moral and intellectual wreckage that litters the academic landscape with respect to Israel, this award [Puar Jasbir's book has just been awarded the National Women's Studies Association Allison Piepmeier Book Prize for scholarship focusing on feminist disability studies] stands out. Nelson makes it clear that even a google search shows how the claims Jasbir makes about Israel harvesting organs are not based on any credible science. See *Israel Denial*, Chapter Six.
9. Robson, "Najib Azuri's *Le Reveil de la Nation Arabe*."
10. According to AIS Bylaws, the Association has a relationship with *Israel Studies*. Some AIS officers are members of the Journal's Editorial Board and AIS members receive a discount on subscriptions. AIS provides no funding for *Israel Studies* nor does it serve as a sponsor. Brandeis University and Ben Gurion University are the Journal's academic sponsors. *Israel Studies Review* is the journal sponsored by AIS, and as President, I never interfered with any of the decisions made by the editors.
11. I served as President from June, 2017-June 2019.
12. Martin, *The Dictionary Wars*.
13. Shafir, *op. cit.*, 2019.

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Problemas Integradores. Vía Para La Activación Del Aprendizaje

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Abstract- The objective of the paper is to offer problems based on the integration of contents that contribute to the activation of the teaching-learning process of students in the Chemistry- Physics discipline of the "Chemistry Education" career of the University of Camagüey. Theoretical research methods were used in order to systematize pedagogical theories that lead to a more active involvement of students in their learning process. Likewise, the results achieved from its implementation in the educational practice in the last three years are described, showing a qualitative and quantitative leap in the quality of learning.

Keywords: teaching; learning; content integration; activation of the teaching-learning process.

GJHSS-G Classification: FOR Code: 339999

Strictly as per the compliance and regulations of:

Problemas Integradores. Vía Para La Activación Del Aprendizaje

Luis Azcuy Lorenz [α], Dr. C. Melva Rivero Rivero [σ] & Lic. Luis Carlos Gutiérrez Rivero [ρ]

Resumen- El objetivo de la ponencia es ofrecer problemas basado en la integración de contenidos que contribuyan a la activación del proceso de enseñanza – aprendizaje de los estudiantes en la disciplina Química-Física de la carrera "Educación Química" de la Universidad de Camagüey. Se emplearon métodos de investigación de índole teórico en aras de sistematizar las teorías pedagógicas que conduzcan a una implicación más activa de los estudiantes en su proceso de aprendizaje. Del mismo modo, se describen los resultados alcanzados a partir de su implementación en la práctica educativa en estos últimos tres años, que muestran en lo cualitativo y cuantitativo un salto superior en la calidad del aprendizaje.

Palabras clave: enseñanza; aprendizaje; integración de contenidos; activación del proceso de enseñanza – aprendizaje.

Abstract- The objective of the paper is to offer problems based on the integration of contents that contribute to the activation of the teaching-learning process of students in the Chemistry-Physics discipline of the "Chemistry Education" career of the University of Camagüey. Theoretical research methods were used in order to systematize pedagogical theories that lead to a more active involvement of students in their learning process. Likewise, the results achieved from its implementation in the educational practice in the last three years are described, showing a qualitative and quantitative leap in the quality of learning.

Keywords: teaching; learning; content integration; activation of the teaching-learning process.

I. Introducción

El perfeccionamiento del proceso de enseñanza-aprendizaje en la República de Cuba se ha convertido en centro de atención para los pedagogos, debido al desarrollo de las nuevas y elevadas exigencias que la Revolución Científico Técnica le plantea a la escuela contemporánea. En este sentido, se estudian vías que propicien un mayor desarrollo de la actividad intelectual, la estimulación del pensamiento creador y la participación activa de los alumnos en la solución de las situaciones que se presentan.

En Cuba y otras latitudes son innumerables los pedagogos que se han destacado en este sentido, entre ellos Shukina (1978), Azcuy (2002), Alba (2004), Estrada (2008), Aguilar (2009), Duane (2009), Yacab (2012), Morán (2015), Ramos, Massip y Alfonso (2017), Correa (2017) dedican especial atención al empleo de métodos que estimulen el pensamiento de los estudiantes, que propicien la búsqueda de información y solución a los problemas que se le presentan con determinadas características que pueden utilizarse durante el desarrollo de cualquiera de los tipos de clase.

Para lograr estas aspiraciones es obvia la necesidad de alcanzar una enseñanza que prepare a los estudiantes a pensar por sí mismos, a aprender a partir de su implicación activa y directa en el proceso y el quehacer científico. Sin embargo, una de las dificultades que hoy exhiben los estudiantes de la licenciatura en Educación Química es su insuficiente papel activo en el proceso de enseñanza – aprendizaje de la disciplina Química-Física, siendo una de las más compleja en el plan del proceso docente por lo denso de su contenido para su comprensión. Constatado por la aplicación de métodos empíricos como la observación, el análisis del producto de la actividad, encuestas a los estudiantes, entre otros. De ahí que, en la literatura pedagógica se reportan diferentes vías para activar el proceso, pero los autores seleccionaron el empleo de problemas con un enfoque que responde a determinadas características, que estimule el interés por lo que se aprende y que integren contenidos de otras disciplinas precedentes y los propios de la Química-Física.

La integración de contenidos, en su esencia, es una herramienta eficaz de trabajo, que implica una labor de colaboración de un colectivo de personas en un plano disciplinar; por cuanto la misma no puede ser resultado de la actividad espontánea aislada y ocasional, sino es la consecuencia del colectivo de profesores. Los autores coinciden con Fiallo (2001) al considerar que "(...) la integración es un momento de organización y estudio de los contenidos, es una etapa para la interacción que sólo puede ocurrir en un régimen de coparticipación, reciprocidad, mutualidad" (p. 26).

De ahí que el objetivo de la investigación, es ofrecer problemas basado en la integración de contenidos que contribuyan a la activación del proceso de enseñanza – aprendizaje de los estudiantes en la disciplina Química-Física de la carrera Educación Química de la Universidad de Camagüey.

Para el desarrollo de la investigación se emplearon métodos teóricos, fundamentalmente

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análisis–síntesis, hipotético-deductivo, histórico-lógico y la modelación. Estos posibilitaron la interpretación conceptual, así como el análisis e interpretación de los resultados obtenidos en la etapa de constatación inicial y de implementación en la que se pudo comprobar la efectividad de los problemas propuesta, así como dar seguimiento durante la fase formativa a las actividades que desarrollaban los estudiantes. Los métodos empíricos empleados son observación participante, pre-experimento, estudio de los productos del proceso pedagógico y pruebas pedagógicas.

Se empleó una muestra de 6 estudiantes de segundo año de la carrera Educación Química de la Universidad de Camagüey.

a) Desarrollo

i. *La integración de contenidos*

Desde la antigüedad diferentes pensadores como Platón (427-347 a.n.e.), Bacon (1561-1626), Comenius (1592-1670), así como ilustres pedagogos cubanos como Varela (1766-1853), Luz Caballero (1800-1862), Martí (1853-1895), Varona (1849-1898), han coincidido en que los conocimientos por sí solos no promueven la solución de los problemas si no se unifican.

En Cuba se han realizados investigaciones en las que se da gran atención a la integración de los contenidos de las disciplinas como proceso altamente efectivo para estimular la actividad cognoscitiva de los estudiantes y formar en ellos un pensamiento dialéctico y creador (Fiallo, 2001; Salazar, 2004; Azcuy y Rivero, 2016).

Para Salazar (citado en Azcuy y Rivero, 2016) la integración de contenidos se define como

> (…) los vínculos que se establecen entre los contenidos de una disciplina/asignatura y entre disciplinas/asignaturas de un mismo ciclo o ciclos diferentes, los cuales permiten el enfoque integrador de la enseñanza y la educación, facilitan la formación de un sistema general de conocimientos, habilidades y valores, que se reflejan en la comprensión por los escolares de la unidad material del mundo y de su cognoscibilidad, de las leyes del desarrollo, de la relación entre los fenómenos, la naturaleza y la sociedad. (p.4)

Para el logro de la integración de contenidos, es necesario que el Colectivo Pedagógico de Año, funcione de forma coordinada, que se realice trabajo metodológico para precisar las relaciones entre las áreas del conocimiento, para lograr una formación interdisciplinaria en los docentes.

Con la integración de contenidos se contribuye a eliminar la parcelación de la enseñanza, cuestión que hoy afecta el proceso docente – educativo. Por lo tanto, la integración de contenidos, como principio básico de la enseñanza se asocia a la cooperación entre los miembros de un equipo o colectivo de trabajo donde la comunicación y el intercambio, posibilitan la eliminación de barreras y fortalecen la preparación científico-metodológica de los profesores elevando el aprendizaje de los estudiantes (Azcuy y Rivero, 2016).

La integración de contenidos no puede ser el resultado de la actividad espontánea, aislada, ocasional, sino una de las bases de la concepción pedagógica centrada en el sujeto; meditada, instrumentada y ejecutada por el colectivo pedagógico. La relación del colectivo no se debe limitar a la relación entre los conocimientos, sino abarca la labor educativa basada en la propia actuación profesional, la motivación y el ejemplo de los profesores (Azcuy y Rivero, 2016).

Para instrumentar la integración de contenidos hay que partir del diagnóstico de las potencialidades y necesidades de cada uno de los estudiantes; es necesario además que el CPA establezca los nodos de integración, el no realizar esta importante acción lleva a la improvisación y a la falta de sistematización.

La integración de contenidos con el fin de activar el proceso de enseñanza – aprendizaje, debe estar concebida desde la estrategia educativa, pues esta asume la diversidad de estudiantes y responde adecuadamente a ella con una concepción donde se oferte una educación ajustada a las necesidades de todos y de cada uno, potenciándose así la personalización de este proceso.

ii. *La activación del proceso de enseñanza – aprendizaje*

En el proceso de enseñanza-aprendizaje se movilizan por parte del maestro las fuerzas motivacionales, volitivas, intelectuales, morales y físicas de los estudiantes asignando a este el papel activo del proceso. De ahí la importancia de la activación del proceso de enseñanza-aprendizaje.

Acerca de la activación de este proceso han sido numerosos los investigadores que se han destacado, entre estos se encuentran Shukina (1978), Azcuy, (2002), Yacab (2012), Morán (2015), Correa (2017), Ramos, Massip y Alfonso (2017). Ellos han tratado el concepto activación en el contexto pedagógico y concuerdan en que es la actividad dirigida al logro de los objetivos propuestos por el educador, intencionada hacia el perfeccionamiento de métodos y estilos de enseñanza, destinados a favorecer en los estudiantes, conocimientos sólidos y estables a partir del desarrollo de hábitos y habilidades, por lo que, por su nivel de complejidad, requiere de condiciones pedagógicas específicas, de comprobados factores que la favorecen.

Los autores se adscriben a la definición propuesta por Alba (2004) que plantea que la activación consiste en

> (…) hacer más dinámico el proceso de enseñanza-aprendizaje, que asignando al estudiante el papel activo, al considerarlo alumno y no objeto del proceso; movilizando el maestro, las fuerzas motivacionales, volitivas, intelectuales,

morales y físicas de los estudiantes, para lograr los objetivos concretos de la enseñanza y de la educación. (p.3)

En esta definición se pone de manifiesto que la movilización o activación de esas fuerzas y capacidades en los estudiantes significa despertar su atención hacia los contenidos de enseñanza, desarrollar sus habilidades y capacidades, lograr un dominio efectivo de los materiales de estudio y un uso creador de los conocimientos, todo esto conduce a la formación de intereses cognoscitivos, motivacionales y necesidades; la formación de conceptos, apropiación de conocimientos, habilidades y hábitos; desarrollo de funciones psíquicas superiores y de todos los componentes de la personalidad; y el incremento de la independencia cognoscitiva.

Para lograr esa activación del proceso de enseñanza-aprendizaje, Shukina (1978) propone tres vías: a) Material docente de contenido e interés nuevo para que el mismo sea interesante a los alumnos; b) La organización de las diversas formas de trabajo docente independiente y creador del alumno; c) Las buenas relaciones creadoras entre el docente y el alumno. (p.56)

La activación depende en gran medida de la objetividad con que el maestro desarrolla sus actividades. Por tanto, es importante que tenga en cuenta dar una explicación amplia, detallada con hechos docentes no expresados en los libros de textos y la incorporación de aspectos interesantes de la vida, dar lo fundamental en la clase y dejar otros elementos para el estudio independiente, con la consecuente orientación y considerar el enfoque polémico para la estructuración de las diferentes situaciones que se puedan presentar (Shukina, 1978, p.56).

Sobre la base de los planteamientos de esta autora y de la definición de activación a la que los autores se afilian es lo que justifica que la activación del proceso de enseñanza-aprendizaje es producto de la interacción social, bajo la dirección del maestro, en el que el estudiante aprende de otros, con los otros, en su interacción se desarrolla la inteligencia práctica, la de tipo reflexivo, construyendo y exteriorizando nuevos conocimientos o representaciones mentales, de manera tal que los primeros favorecen la apropiación de otros y así sucesivamente, es un producto y resultado de la educación y no un simple requisito.

Hoy se habla de un cambio en el proceso de enseñanza – aprendizaje de las Ciencias, donde la Química no está exenta y menos aún la asignatura Química-Física (I) de la Educación Universitaria, cambio que se traduce en el tránsito del protagonismo del profesor al protagonismo del estudiante, del discurso a la acción constructora, de la uniformidad a la diferenciación personal, de un enfoque no contradictorio a uno contradictorio, lo que requiere nuevas transformaciones en las formas de enseñar y aprender.

Existen diferentes vías reportadas en la literatura pedagógica para contribuir a la activación del proceso de enseñanza – aprendizaje, entre ellas la enseñanza problémica, la enseñanza diferenciada, las nuevas tecnologías, entre otros, pero los autores son del criterio de utilizar problemas con un enfoque que respondan a determinadas características y que facilite la integración de contenido con el fin de incentivar el interés de los estudiantes por aprender; de optimizar habilidades intelectuales, motoras y/o sociales; de facilitar la comprensión de contenidos; de promover la participación activa de los estudiantes comprometiéndolo con el mencionado proceso; de permitir el desarrollo de la creatividad; y, poseen una gran riqueza de posibilidades, todas ellas desde la perspectiva de una educación integral.

La asignatura Química-Física (I) del Plan de estudio E de la carrera de Educación Química de la Universidad de Camagüey, está conformada por los temas siguientes: Primer Principio de la Termodinámica; Segundo Principio de la Termodinámica; Potenciales Termodinámicos; Equilibrio de fase en sistemas unicomponentes; Equilibrio de fase en sistemas bicomponentes y Equilibrio químico, los cuales presentan contenidos que tradicionalmente por su complejidad, a los estudiante, le cuesta trabajo su comprensión porque la explicación hay que buscarla a partir de la integración de conocimientos interdisciplinar (Español, Matemática, Física, entre otras) e intradisciplinar (Química General, Química Inorgánica, entre otras) de hechos y fenómenos que ocurren en la naturaleza.

En correspondencia con lo planteado anteriormente se ha priorizado la elaboración de problemas para el tema (I) *Primer principio de la termodinámica* específicamente en la parte correspondiente a la Termoquímica cuyo sistema de conocimiento abarca de la Ley de Hess hasta la Ecuación de Kirchchoff, los cuales tienen una gran aplicación en la práctica, sea en la vida doméstica, industrial como investigativa.

Los problemas elaborados responden a las invariantes del conocimiento del tema seleccionado y está estructurado en dos momentos uno referido a experiencias metodológicas de cómo tratar el contenido a partir de situaciones que conduzcan a incentivar el interés por conocer y pensar lo que facilita su entendimiento, su comprensión y su vez, la apropiación del mismo por parte del estudiante; una vez que conozca el aparato conceptual mínimo necesario, ya está en condiciones de aplicarlo a situaciones nuevas, que este sería el segundo momento del proceso. Aquí se deben plantear problemas bien elaborados con un enfoque que respondan a determinadas características que generen dudas, interrogantes, contradicciones, incertidumbres y que se relacionen con la vida práctica, que tengan un carácter

interdisciplinario que tribute a su reafirmación profesional, todo esto implica una movilización del pensamiento, la creación y la búsqueda de vías de solución.

También los autores se retroalimentaron de los ejercicios y problemas que vienen en el libro de texto y muchos fueron transformados sobre la base de lo antes expuesto y las vivencias alcanzadas en el decursar del tiempo, así como las sugerencias dadas por los propios estudiantes.

Se sugiere que, a la hora de la utilización de los problemas por parte del estudiante o cualquier persona, lo ideal sería pasar por el primer momento antes de pasar al segundo, pero si el estudiante se siente bien puede comenzar por el segundo momento y él se dará cuenta de qué necesita. Todo esto conduce a la necesidad del estudio sistemático, aspecto muy importante para la formación de un estudiante universitario integral.

A continuación, se ilustra algunos problemas dirigido a la parte de Termoquímica.

1) El metano **(CH_4)** y el butano **(C_4H_{10})** son gases combustibles que pueden obtenerse por destilación fraccionada del petróleo, pero el metano es el gas principal que se obtiene en los digestores del biogás a partir de desechos de la industria azucarera, de la agricultura y de excretas de animales.

1.1 ¿Cuál de los dos gases es mejor combustible? Demuéstrelo cuantitativamente. Expréselo en unidades de kJ y kcal. Asumir que se queman volúmenes iguales de ambos gases medidos a temperatura ambiente y presión estándar.

(a) $CH_4\,(g) + 2\,O_2\,(g) = CO_2\,(g) + 2H_2O\,(l)$

(b) $C_4H_{10}\,(g) + 13/2\,O_2\,(g) = 4\,CO_2\,(g) + 5H_2O\,(l)$

Datos:

$\Delta H^\circ_{(CH4)f} = -74{,}85$ kJ.mol^{-1} ; $\Delta H^\circ_{(CO2)f} = -393{,}5$ kJ.mol^{-1} ; $\Delta H^\circ_{(H2O)f} = -286{,}0$ kJ.mol^{-1} ;

$\Delta H^\circ_{(C4H10)f} = -124{,}7$ kJ.mol^{-1}

1.2 ¿Cuál de los dos gases será el combustible más económico para la cocina del comedor obrero de un central azucarero?

2) El profesor de Química-Física le plantea a los estudiantes durante el desarrollo de una de las clases prácticas de Termoquímica que el valor del calor involucrado en la reacción de hidrogenación del propeno **(C_3H_6)** es -123,876 kJ.

$C_3H_6\,(g) + H_2\,(g) = C_3H_8\,(g)\quad \Delta Hr^\circ = -123{,}876$ kJ

2.1 Compruebe este resultado utilizando los calores de combustión estándar del propeno (-2057,75 kJ/mol), del dihidrógeno.

2.2 A partir de los calores de combustión del *carbono, dihidrógeno* y *propeno*. Halle el calor de formación estándar del propeno.

2.3 Con los datos de los incisos anteriores y de los calores de formación estándar. Halle el calor de combustión estándar del propeno.

(Puedes auxiliarte de tablas de datos de variación de entalpía de formación y de combustión para condiciones estándar).

3) El profesor de Química-Física le plantea a un grupo de estudiantes aventajados durante el desarrollo de una de sus actividades que prediga en cuál de las moléculas etano, eteno y etino de igual número de átomos de carbono hay que suministrar más energía de disociación de enlace para separar los átomos de carbono.

3.1 ¿En cuál de las moléculas anteriores el enlace carbono-carbono es más débil? Justifique.

3.2 ¿Cuál de estas moléculas es la más reactiva químicamente? Justifique.

Datos:

$2C(s) + 3H_2\,(g) = C_2H_6(g)\quad \Delta H^\circ f = -84$ kJ.mol^{-1}

$2C(s) + 2\,H_2(g) = C_2H_4(g)\quad \Delta H^\circ f = 51$ kJ.mol^{-1}

$2C(s) + H_2\,(g) = C_2H_2\,(g)\quad \Delta H^\circ f = 228$ kJ.mol^{-1}

$C\,(s) + 2H_2\,(g) = CH_4\,(g)\quad \Delta H^\circ f = -74{,}9$ kJ.mol^{-1}

$C\,(s) = C\,(g)\quad \Delta H^\circ s = 715{,}0$ kJ.mol^{-1}

$H_2\,(g) = 2H\,(g)\quad \Delta H^\circ D = 436{,}0$ kJ.mol^{-1}

4) El profesor de Química-Física durante el desarrollo de las clases prácticas del tema Termoquímica le plantea a los estudiantes de la carrera de "Educación Química" que comprueben si el valor del calor de formación del agua, gaseosa es 501,2248 J a 1500 K.

$2\,H_2\,(g) + O_2\,(g) = 2\,H_2O\,(g)\quad \Delta H^\circ_{298\,K} = -483768{,}4$ J

Datos:

$Cp\,(H_2O) = (30{,}0788 + 0{,}0099T + 8{,}7215 \bullet 10^{-7}\,T^2)$ J. K^{-1}.mol^{-1}

$Cp\,(O_2) = (25{,}5092 + 0{,}0136\,T - 4{,}2565 \bullet 10^{-6}\,T^2)$ J. K^{-1}.mol^{-1}

$Cp\,(H_2) = (29{,}0727 - 0{,}00083\,T + 2{,}0121 \bullet 10^{-6}\,T^2)$ J. K^{-1}.mol^{-1}

Para implementar los problemas, los autores proponen una *metodología* sobre la base del criterio de Rico, (2002), que plantea: *lo motivacional,* la *orientación, ejecución* y el *control,* como fases del desarrollo de la actividad docente (ejercicios, problema, tareas, entre otros). Esta metodología tiene un carácter flexible, dinámica y se retroalimenta constantemente. (p.54)

II. Resultados de la Implementación de Los Problemas

Para valorar el resultado de la implementación en la práctica educativa de los problemas elaborados en el tema *primer principio de la termodinámica*, se desarrolló un pre-experimento en el que participaron 6 estudiantes de segundo año de la carrera Educación Química de la Universidad de Camagüey.

Inicialmente se les aplicó una prueba pedagógica que se tuvo como objetivo evaluar el nivel

de conocimientos que tiene cada estudiante sobre algunos contenidos precedentes necesarios para acometer el estudio de la asignatura Química-Física (I).

Una vez tabulados los resultados y realizado el análisis de los mismos se constató que en la categoría de Mal hay 4 estudiantes que representa el 67%, 2 estudiantes alcanzaron la categoría de Regular (33%) y ninguno de Bien. Este resultado evidencia el insuficiente aprendizaje de los estudiantes muestreados en esta parte del contenido precedente necesario para acometer el estudio del tema *primer principio de la termodinámica*.

Al analizar estos resultados se infiere que no hay perdurabilidad del conocimiento, no saben organizar la información extraída del texto, así como tienen dificultades para planificar y organizar el sistema de acciones que debe ejecutar para solucionar el problema. También se constató falta de interés para enfrentar la actividad, insuficiente perseverancia y esfuerzo volitivo para realizarlo.

Una vez realizado este diagnóstico inicial se procedió a la implementación de los problemas en las 4 clases prácticas de Termoquímicas que corresponden a procesos termodinámicos, ley de Hess, energía de disociación de enlace y ecuación Kirchchoff. Estos contenidos tienen gran aplicación por ejemplo en Química Inorgánica y Química Orgánica, entre otras.

En el momento de la revisión de los problemas los alumnos exponen la vía que siguieron para su solución, se debate y se enriquece a partir de otras vías propuestas por ellos o por el profesor en caso necesario. A partir de estos resultados se realiza la autoevaluación y la coevaluación, pues ellas enriquecen su modo de actuar; para realizar esta se tienen en cuenta los siguientes indicadores:

1) Calidad de las respuestas.
2) Empleo del vocabulario técnico.
3) Calidad de la expresión oral.

Durante el desarrollo del pre-experimento se controló la actividad de los estudiantes mediante la observación participante y el estudio de los productos del proceso pedagógico. Se registró en cada sesión de trabajo el desenvolvimiento de los estudiantes en la solución de las situaciones planteadas; esto posibilitó conocer el avance que se iba experimentando en cada uno de los estudiantes.

Una vez concluido el experimento se aplicó una nueva prueba pedagógica que medía los mismos objetivos de la prueba empleada para la constatación inicial. Se realiza la tabulación y análisis de los resultados constatándose que solo 6 alcanzaron la categoría de *Bien* para un 84% existiendo una mejoría en el aprendizaje de los estudiantes.

Al comparar el resultado de la prueba de entrada con la prueba de salida y valorar la transformación experimentada, se evidencia un significativo avance tanto desde el punto de vista cualitativo como cuantitativo, lo que se refleja en:

- Un mayor interés y esfuerzo de los estudiantes por realizar los problemas, perseveran por encontrar la solución.
- Mejor motivación por las clases de Química-Física (I), lo que se evidencia durante el estudio de los temas posteriores e inclusive durante la impartición de la Química-Física (II).
- Aplicación en la práctica profesional pedagógica, así como en su vida cotidiana lo aprendido mediante los problemas integradores.
- Logro de protagonismo en la solución de los problemas y tareas de todas las asignaturas.
- Mejores resultados académicos.

III. Conclusiones

- Los problemas elaborados con un enfoque que responden a determinadas características posibilitan al estudiante integrar contenidos de años precedentes y de las diferentes asignaturas que recibe en ese curso, así como da las herramientas necesarias para análisis termodinámico de procesos que se estudiarán en disciplinas posteriores del currículo de la carrera.
- La valoración de los resultados de la implementación de los problemas integradores propuestos en esta investigación, evidencian que estos influyen favorablemente en el aumento del papel protagónico del estudiante en el proceso de enseñanza – aprendizaje, lo que repercutió en el mejoramiento de sus resultados docentes.

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Vocational and Technology Education: A Tool to Industrialization in Bayelsa State, Nigeria

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Abstract- The study examined Vocational and Technology Education, a tool to industrialization in Bayelsa state, Nigeria. The design for the study was comparative survey research design. The population of the study was 98 university graduates of vocational and technology education working in Yenagoa Metropolis, Bayelsa State. The population consists 50 males and 48 females respectively. The instrument for data collection was a questionnaire. The instrument was titled "Vocational and Technology Education Industrialization Questionnaire" (VTEIQ). The instrument have three (3) research questions with twelve (12) statement items. instrument was validated by three experts on face, content and construct respectively. The reliability coefficient was carried out using test-retest method which yielded 0.83. Mean with standard deviation were used to answer the research questions. The hypotheses was tested using Z-test analysis at 0.05 level of significance. From the findings, it was revealed that male and female ratings of university graduates of vocational and technology education with respect to job creation, poverty alleviation and self reliance for industrialization in Bayelsa State, Nigeria have a high extent as a tool for industrialization and it also revealed that there is no significant difference between male and female university graduates of vocational and technology education with respect to job creation, poverty alleviation and self reliance.

Keywords: *vocational education, technology education, tool and industrialization.*

GJHSS-G Classification: *FOR Code: 139999*

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Vocational and Technology Education: A Tool to Industrialization in Bayelsa State, Nigeria

Ehimen, Theophilus Ehijele [α] & Opia, Bubaraye [σ]

Abstract- The study examined Vocational and Technology Education, a tool to industrialization in Bayelsa state, Nigeria. The design for the study was comparative survey research design. The population of the study was 98 university graduates of vocational and technology education working in Yenagoa Metropolis, Bayelsa State. The population consists 50 males and 48 females respectively. The instrument for data collection was a questionnaire. The instrument was titled "Vocational and Technology Education Industrialization Questionnaire" (VTEIQ). The instrument have three (3) research questions with twelve (12) statement items. instrument was validated by three experts on face, content and construct respectively. The reliability coefficient was carried out using test-retest method which yielded 0.83. Mean with standard deviation were used to answer the research questions. The hypotheses was tested using Z-test analysis at 0.05 level of significance. From the findings, it was revealed that male and female ratings of university graduates of vocational and technology education with respect to job creation, poverty alleviation and self reliance for industrialization in Bayelsa State, Nigeria have a high extent as a tool for industrialization and it also revealed that there is no significant difference between male and female university graduates of vocational and technology education with respect to job creation, poverty alleviation and self reliance. However, it was recommended among others that Bayelsa State government should invest in vocational and technology education in order to equip youths with the necessary skills for industrialization.

Keywords: vocational education, technology education, tool and industrialization.

I. Introduction

The development of a state depends on the attention given to the kind of education its citizens acquire. The state grows when education becomes a top priority among other needs, change becomes inevitable. Education is the renewing of the mind of an individual to effect change in the environment. The process of preparing an individual for work oriented change in the environment is known as Vocational Education. Elizabeth (2007), opines Vocational Education as skills and education that prepares a person for a job. It is an education aimed at preparing students for their present /future employment, which may take place in colleges of further education, universities or workplace itself and is increasingly being offers to secondary school pupils in the form of work experience (Mairi and George, 1999). However, Bot (2021) sees vocational education as that education that prepares people to work as a technician or to take up employment in a skilled craft or trade as a tradesperson or artisan. It further stated that it is that education training that provides the necessary knowledge and skills for employment. When a student graduates from vocational schools, the graduate is fully equipped with the necessary skills to face the world of work to earn a living and become a useful being to the society. Vocational education prepares individual for usefulness and not liabilities. Vocational education is a fundamental element in the development equation because it allows individuals and societies to unlock their potentials, expand horizons and adopt to the changes in the dynamic world (Nsiah-gyabaah as cited in Elogbo, Eno, and Emogor, 2013). However, Akerele as cited in Elogbo, Eno and Emogor 2013) indentified vocational education as that aspect of education that exposes the learner to acquisition of demonstrable skills that could be transformed into economic benefit. Furthermore, Elogbo, et al (2013) opines Vocational Education as to acquire the particular skills, know-how and understanding necessary for employment in a particular occupation, trade or group of occupations. Vocational education helps develop the individual to understand personal skills in creating solutions to problems in the society.

Hence, the individual derives pleasure from the skills acquired to create a conducive working environment, in so doing the society benefits and peace and harmony is enjoyable at all level of life. Therefore, vocational education is that aspect of the general school curriculum concerned with the acquisition of knowledge, attitudes and skills necessary for securing and advancing in a given occupation (Oranu, as cited in Asotibe and Dan-Maigona (2016, p.75).

However, research has revealed that vocational education and technology education are intertwined to prepare an individual for usefulness in the society. Therefore technology education is the study and knowledge of the practical especially industrial, use of scientific discoveries (Elizabeth, 2007). However, it is the practical use of scientific knowledge in industry and everyday life (Mairi and George, 2007). Technology education is often encapsulated as learning by doing,

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(Foster, 2019). Furthermore, it is field of study that covers the human ability to shape and change the physical world to meet needs, by manipulating materials and tools with techniques. It is the application of knowledge to the activity of making (Irishtime, 2021). The step-by step process of constructing a particular thing that shall be beneficiary to the society is called technology education.

Therefore, Vocational and Technology Education is a tool to industrialization. Industrialization is the sense of introducing development to a given state, to equip the citizens with the needed skills for self relevance and economic development. The acquisition of technological skills is very imperative to increase industrialization processes. The effect of vocational and technology education on the economy of a state cannot be over emphasized. A state that values the economical growth and development of its citizens should be kin to vocational and technology education.

Hence, this study, vocational and technology education: a tool to industrialization in Bayelsa State, Nigeria tends to reveal imperative role to industrialization through:

Job creation: Job creation is the act of making more jobs available especially for unemployed youths (Asogwa, Isiwu and Ugo, 2016). Vocational and technology Education equip individuals with required vocational and technological skills needed to create job for unemployed to be gainfully employed to give joy and improve livelihood of youths in the society. When an individual is employed, the psychological and physical needs are met directly or indirectly whereby giving the individual a stable health condition. The acquisition of vocational and technological skills is a strong source of wealth creation that helps to alleviate poverty (Obunadike, 2013). Therefore, the need for training and retraining of skill personnel on resource management shall lead to job creation in the society (Uko, 2013).

Poverty Alleviation: Poverty is a condition in which a person is unable to maintain a living standard adequate for physical and mental efficiency (Khathiravan as cited in Iloma, Osaji and Atose, 2020). Poverty contributes immensely to break down of laws and order, criminality, contamination of societal values and death (Iloma, Osaji and Atose, 2020). However, poverty alleviation is a set of measures, both economic and humanitarian that is intended to permanently lift people out of poverty (Cluebot, 2021). The provision of vocational and technology education is a solution to existing poverty in the urban and rural areas of a state (Akerelele, Abinbola, Odekunle and Opatola as cited in Awodoyin, Aishatu and Ednna, 2016). However, vocational and technology is a tool that can help in alleviating poverty and so there is the need to equip the poor with such vocational and technological skills which shall at the end help to reduce poverty to its minimum. The adequate engagement of human and material resources shall definitely foster alleviation of poverty in a state. Therefore, Eze as cited by Ogwa (2016) that Vocational and Technology Education prepares individuals for job. Skills and competencies is the major tool that can empower the youths and free them of the shackles of poverty and as well as potent instrument for reducing incidences of social vices being engaged by youths in the society (p.169). This is in accordance with united nation's sustainable development goals number 1 which states no poverty- the end of extreme poverty "living on less than $ 1.90 per day". Poverty reduction could emanate directly from the effect of skills acquisition in vocational and technology education as youths with acquired saleable skills would apply such in production venture that would undoubtedly increase their earning capacity (Ogwa, 2016, p.169)

Self Reliance: When an individual is equipped with the necessary vocational and technological skills, there is trust in one's self concerning work experience when handing life related problems. The conditions of creating and making a thing at ease bring about inner self satisfaction when working. Vocational and technology education enhance an individuals' ability to depend on himself to get things done and to meet one's own needs. In accordance with the goal of national policy on education (2013) that vocational education gives training and impart the necessary skills to individual who shall be self reliant economically likewise give training and impart the necessary skills for the production of technicians, technologists and skilled personnel who shall be enterprising and self-reliant. The need for self-reliance of vocational and technological skill personnel made the government to introduce, adopt and implement skill acquisition programme in school to youths to enable them to be self employed and self-reliance (Obunadike, 20013). Furthermore, Iloma, Osaji and Atose, (2020) indicates that skills increases the chances for self reliance, provision of employable youths in the society.

II. Statement of the Problem

It is obvious that Bayelsa State is a civil service state that solely depends on federal allocation to sustain its governmental obligations. When federal allocation for the state drops, it affects the economy of Bayelsa State and there will be delay in the governmental obligation such as prompt payment of workers' salaries, construction of projects among others. In addition, in order to curb governmental obligatory delays, the need for industrial revolution via vocational and technology education should be considered to improve the betterment of the state for sustainable livelihood. However, high rate of unemployment increases as students graduate yearly from tertiary institutions in the state, crime is a recurrent activity every citizen is

conscious off at all times that it might happen to anybody especially in the Yenagoa metropolis Bayelsa State. Some youths make asking of alms as a life style, instead of acquiring appropriate vocational and technological skills for sustainable development, they rather stand at busy junctions to beg passerby for financial help. Sincerely, vocational and technology education is capable of empowering youths for industrialization in the state to increase employment opportunities. The problem of the study therefore is, how is vocational and technology education a tool for industrialization in Bayelsa state, Nigeria.

a) Purpose of the study

The main purpose of this study was to determine vocational and technology education: a tool to industrialization in Bayelsa State Nigeria. Specifically, the study determines;

1. The extent vocational and technology education a tool to job creation for industrialization in Bayelsa State, Nigeria.
2. The extent vocational and technology education a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria
3. The extent vocational and technology education a tool to self reliance for industrialization in Bayelsa State, Nigeria.

b) Research Questions

The following research questions guide the study.

1. To what extent does vocational and technology education a tool to job creation for industrialization in Bayelsa State, Nigeria?
2. To what extent does vocational and technology education a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria?
3. To what extent does vocational and technology education a tool to self-reliance for industrialization in Bayelsa State, Nigeria?

c) Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

Ho_1: There is no significant difference in the mean ratings of male and female university graduates of vocational and technology education with respect to job creation for industrialization in Bayelsa State, Nigeria.

Ho_2: There is no significant difference in the mean ratings of male and female university graduates of vocational and technology education with respect to poverty alleviation for industrialization in Bayelsa State, Nigeria.

Ho_3: A significant difference does not exist in the mean ratings of male and female university graduates of vocational and technology education with respect to self reliance for industrialization in Bayelsa State, Nigeria.

III. Methodology

The study adopted comparative survey research design aimed at vocational and technology education as a tool to industrialization in Bayelsa State, Nigeria. According to Bari (2021). is the act of comparing two or more thing with a view to discovery something about one or all of the things being compared.

The study was made up of 98 university graduates of vocational and technology education living in Yenagoa metropolis. The population consist 50 males and 48 females graduates of vocational and technology education. There was no sample technique, the whole population was used for the study. The instrument for data collection was a questionnaire. Titled: Vocational and Technology Education Industrialization Questionnaire (VTETIQ). The questionnaire have three research questions, each research question was sub-divided into four questions which made up twelve questions sought on information on Vocational and Technology education as a tool to job creation, poverty alleviation and self –reliance. The instrument consist of five point rating scale option with Very High Extent (VHE), High Extent (HE) Moderate Extent (ME), Low Extent (LE) and Very Low Extent (VLE). Using a cut-off mean of 3.00. The validity of the instrument was validated by three experts on face, content and construct respectively. The reliability coefficient was carried out using test-retest method. The administration of the (VTETIQ) instrument was administered twice within an interval of two weeks. The scores obtained from the administration of the instrument were subjected to Pearson Product Moment Correlation Coefficient which yielded 0.83. The data gathered was analyzed with mean and standard deviations to answer the research questions and the hypotheses were tested using z-test analysis at 0.05 level of significance.

Research Question 1: To what extent does Vocational and Technology Education a tool to job creation for industrialization in Bayelsa State, Nigeria?

Table 1: Mean and standard deviation scores of male and female respondents on the extent of vocational and technology education as a tool to job creation for industrialization in Bayelsa State, Nigeria.

S/N	Questionnaire items To what extent does:	University graduates of vocational and technology education						
		Male N = 50		Female N = 48		Overall analysis and decision		
		X	SD	X	SD	X	SD	Decision
1	University graduates of vocational and technology education produce consumable goods	3.95	1.11	3.50	1.27	3.75	1.19	High extent
2	University graduates of vocational and technology education become employers of labor	3.86	1.26	3.60	1.20	3.75	1.25	High extent
3	University graduates of vocational and technology education make their services useful	3.84	1.02	3.90	1.17	3.86	1.10	High extent
4	University graduates of vocational and technology education promote their products in the market	3.96	0.99	3.13	1.38	3.55	1.19	High extent
Grand Mean		3.90	1.10	3.53	1.30	3.73	1.18	High extent

Source: field survey, 2021

The data presented in table 1 reveals that the mean scores of 3.95, 3.86, 3.84 and 3.96 for male university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.90 was also greater than the cut-off mean score of 3.00. This implies that, there exist a high extent of vocational and technology education as a tool to job creation for industrialization in Bayelsa State, Nigeria.

The data also indicates that the mean scores of 3.50, 3.60, 3.90 and 3.13 for female university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.53 was also greater than the cut-off mean score of 3.00. This implies that, there exist a high extent of vocational and technology education as a tool to job creation for industrialization in Bayelsa State, Nigeria.

Research Question 2: To what extent does Vocational and Technology Education as a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria?

Table 2: Mean and standard deviation scores of male and female respondents on the extent of vocational and technology education as a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria.

S/N	Questionnaire items To what extent does:	University graduates of vocational and technology education						
		Male N = 50		Female N = 48		Overall analysis and decision		
		X	SD	X	SD	X	SD	Decision
5	Vocational and technological skills reduce poverty	3.70	1.11	3.83	1.19	3.77	1.15	High extent
6	Vocational and technological activities alleviate poverty	3.84	1.16	3.27	1.40	3.56	1.28	High extent
7	Vocational and technology education reduce unemployment in society	4.00	0.97	3.37	1.38	3.69	1.78	High extent
8	Vocational and technology education help to sustain livelihood	3.66	1.22	3.65	1.31	3.66	1.27	High extent
Total Mean		3.80	1.12	3.53	1.32	3.67	1.20	High extent

Source: Field survey, 2021

The data presented in table 2 revealed that, the mean score of 3.70. 3.84, 4.00 and 3.66 for male university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.80 was also greater than the cut-off mean score of 3.00. This implies that, there exist a high extent of vocational and technology education as a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria.

The data also indicates that the mean scores of 3.83, 3.27, 3.37 and 3.65 for female university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.53 was also greater than the cut-off mean score of 3.00. This implies that, there exist a positive extent of vocational and technology education as a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria.

Research Question 3: To what extent does Vocational and Technology Education as a tool to self-reliance for industrialization in Bayelsa State, Nigeria?

Table 3: Mean and standard deviation scores of male and female respondents on the extent of vocational and technology education as a tool to self-reliance for industrialization in Bayelsa State, Nigeria.

S/N	Questionnaire items To what extent does:	University graduates of vocational and technology education						
		Male N = 50		Female N = 48		Overall analysis and decision		
		X	SD	X	SD	X	SD	Decision
9	University graduates of vocational and technology education exercise confidence in skilled works	3.68	1.22	3.73	1.22	3.71	1.22	High extent
10	University graduates of vocational and technology education promote satisfaction when handling practical jobs	4.12	0.94	3.19	1.38	3.66	1.16	High extent
11	University graduates of vocational and technology education enhance individual abilities in practical jobs	3.40	1.26	3.52	1.28	3.46	1.27	High extent
12	University graduates of vocational and technology education enhance self actualization	3.74	1.24	3.81	1.09	3.76	1.17	High extent
Total Mean		3.74	1.17	3.56	1.24	3.65	1.21	High extent

Source: Field survey, 2021

The data presented in table 3 shows that, the mean score of 3.68, 4.12, 3.40 and 3.74 for male university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.74 was also greater than the cut-off mean score of 3.00. This implies that, there exist a positive extent of vocational and technology education as a tool to self-reliance for industrialization in Bayelsa State, Nigeria.

The data also indicates that the mean scores of 3.75, 3.19, 3.52 and 3.81 for female university graduates of vocational and technology education in Bayelsa State, Nigeria were greater than the cut-off mean score of 3.00. On the whole, the grand mean score of 3.56 was also greater than the cut-off mean score of 3.00. This implies that, there exist a high extent of vocational and technology education as a tool to self-reliance for industrialization in Bayelsa State, Nigeria.

a) Testing of Hypothesis

Research hypothesis Ho_1: There is no significant difference in the mean ratings of male and female university graduates of vocational and technology education with respect job creation for industrialization in Bayelsa State. Nigeria.

Table 4: Z-test analysis of male and female respondents on the extent of vocational and technology education as a tool to job creation for industrialization in Bayelsa State Nigeria.

University graduates in vocational & technology education	N	df	z-cal	z-critical	p < @ 0.05
Male	50				
Female	48	96	1.52	1.96	Not significant

NS =Not significant, df. 96, N_m = 50, N_f = 48

The data in table 4 shows that the z – test analysis is not significant at p < 0.05 alpha level because the calculated z-value of 1.52 is less than the critical table z-value of 1.96 at 0.05 alpha level with 96

degrees of freedom. Hence, the null hypothesis which states that, there is no significant difference between male and female university graduate of vocational and technology education as a tool to job creation for industrialization in Bayelsa State, Nigeria is accepted.

Research hypothesis Ho_2: There is no significant difference in the mean rating of male and female University graduates of vocational and technology education with respect poverty alleviation for industrialization in Bayelsa State. Nigeria.

Table 5: Z-test analysis of male and female respondents on the extent of vocational and technology education as a tool to poverty alleviation for industrialization in Bayelsa State Nigeria.

University graduates in vocational & technology education	N	Df	z-cal	z-critical	p < @ 0.05
Male	50				
Female	48	96	1.08	1.96	Not significant

NS= Not significant, df. 96, N_m = 50, N_f = 48

The data in table 5 shows that the z – test analysis is not significant at p < 0.05 alpha level because the calculated z-value of 1.08 is less than the critical table z-value of 1.96 at 0.05 alpha level with 96 degrees of freedom. Hence, the null hypothesis which states that, there is no significant difference between male and female university graduate of vocational and technology education as a tool to poverty alleviation for industrialization in Bayelsa State, Nigeria is accepted.

Research hypothesis Ho_3: A significant difference does not exist in the mean rating of male and female university graduates of vocational and technology education with respect to self reliance for industrialization in Bayelsa State, Nigeria.

Table 6: Z-test analysis of male and female respondents on the extent of vocational and technology education as a tool to self reliance for industrialization in Bayelsa State Nigeria.

University graduates in vocational & technology education	N	df	z-cal	z-critical	p < @ 0.05
Male	50				
Female	48	96	0.74	1.96	Not significant

NS = Not significant, df. 96, N_m = 50, N_f = 48

The data in table 6 shows that the z – test analysis is not significant at p < 0.05 alpha level because the calculated z-value of 0.74 is less than the critical table z-value of 1.99 at 0.05 alpha level with 96 degrees of freedom. Hence, the null hypothesis which states that, a significant difference does not exist in the mean rating of male and female University graduates of vocational and technology education with respect to self reliance for industrialization in Bayelsa State, Nigeria is upheld.

IV. Discussion of Findings

The result in table 4 indicates that there is no significant difference between male and female University graduates of vocational and technology education respondents with respect to job creation for industrialization in Bayelsa State, Nigeria. This is in consonance with Obunadike (2013) who carried out an investigation on entrepreneurship skill acquisition for wealth creation of youths in Ihiala, Anambra State. The study discovered 155 skills items required for training Senior Secondary School graduates in oil palm nursery enterprise for economic success and wealth creation. Therefore, it implies that vocational and technology education contributes to industrialization in Bayelsa State.

Furthermore, table 5 shows that there is no significant difference between male and female university graduates of vocational and technology education in respect to poverty alleviation for industrialization in Bayelsa State, Nigeria. However, this study is in agreement with Iloma, Osuji & Atose (2020) who carried out a study on youth empowerment and entrepreneurial competencies through innovations and research in industrial technical education (ITE) for poverty eradication and sustainable national development. The study identified that job shadowing is a strategy for youth development and entrepreneurial competencies.

In addition, the result in table 6 shows that there is no significant difference between male and female University graduates of vocational and technology education respondents with respect to self reliance for industrialization in Bayelsa State, Nigeria .This finding is in agreement with Elogbo (2013) who carried out a study on the role of Technical, Vocational Education and Training in job creation. The study highlighted that vocational and technical education is a practical skill oriented program for learning that prepares the trainees for self reliance.

It is imperative to state that the respondents agreed to a high extent that Vocational and Technology

Education is a tool to industrialization in Bayelsa State, Nigeria with respect to job creation, poverty alleviation and self-reliance.

V. Conclusion

The study discovered that vocational and technology education is considered as a tool to industrialization in Bayelsa State, Nigeria with respect to job creation, poverty alleviation and self-reliance. However, from the study it was revealed that vocational and technology Education have a positive extent in the development of youths and the state at large. When the youths of a state is equipped with the necessary skills that shall add indelible meaning to their lives, the state develop drastically because the youths of the state are engaged in meaningful ventures.

VI. Recommendations

1. Bayelsa state government should invest more in vocational technology education to encourage youths to venture into it.
2. Vocational and technology education should be given a top priority in the state educational system.
3. Grants should be given to university graduates of vocational and technology education to encourage consumer's goods production in the state.

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Tips for writing a good quality Social Science Research Paper

Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

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Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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save our planet

Global Journal of Human Social Science

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