

# ARTIFICIAL INTELLIGENCE AND EDUCATION

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## ABSTRACT:

The following study attempts to explore the popular trend of artificial intelligence (AI). AI is defined as the automation of cognitive human behavior which has created infinite opportunities for businesses and organizations (Jarek,2019). The focus of this study is how AI can be integrated in the context of an educational institution. In particular, the study dives deep into juxtaposing AI in Monsif National School (M.N.S) as a case study. Nevertheless, AI will be implemented in MNS as a tool that improves organization effectiveness and efficiency without replacing its human capital. However, in this study, AI implementation requires a step backwards to test the organization foundation through the Socio-economic approach to management (SEAM) to analyze and solve the dysfunctions of this 83-year-old school.

**Key words:** Artificial intelligence, education, SEAM, human capital, school, organizational foundation.

## INTRODUCTION

The purpose of this study is to try to implement AI in the educational industry, specifically in the Lebanese schooling system, particularly at Monsif National School. AI, to a certain extent, has been implemented in education in some countries such as China and the USA. However, when it comes to the schooling sector, the implementation is very light at best. Due to the Covid-19 pandemic, the world had to adjust and adapt fast. The educational sector should as well, and we should be moving from traditional education as soon as possible or a lot of schools all over the world will be out of business. Below I will be discussing the development of AI technology and its use in education according to what I found in articles and papers. By the end of this study, my objective is to try and find how we can use technology (AI) to customize and optimize our students', teachers', and managers' skills within the schooling system, specifically MNS, simply because education prepares students to face the changes in our world, and AI is the future.

The development of technology and the rise of AI, particularly in the 21<sup>st</sup> century, has caught the eyes of theorists and academics in almost every field. In this sense, the literature that examines, addresses, and studies AI and its

integration in every field has increased significantly and extensively. One of the major fields that have examined and addressed the integration of AI is education. Many scholars and theorists define AI as the technology that is developed to perform tasks more efficiently and effectively that are usually done by humans such as decision-making, creating, designing, problem-solving, learning, and many other cognitive behaviors (Bellman, 1978). Kurzweil (1990) also agrees with the prior studies and suggests that AI is basically the technology that is human (referring to the functions it performs). In addition, Wang (2019) mentions that AI is the digitization and automation of human features such as rational thinking, decision-making, learning, memorizing, perceiving, cognitive behaviors and intelligent attitudes.

AI means that there is a rationality aspect to the automation of machines (Winston, 1992 as cited in Russell & Norvig, 1995, p.5). In order to provide an overview on AI, it is important to mention that a major aspect of AI's rationality is in the form of machines and not humans. Therefore, AI in general, is a field of study that is associated with connecting intelligence with machines so that the functions that can only be done by human actions can be replaced with machineries (Kurzweil, 1990; Schalkof 1990). As such, AI can be a critical tool in the education field to maximize potentials and opportunities amongst learners and teachers as well as minimizing challenges. The two leading countries in the world when it comes to AI in general and its implementation in education in particular are China and the USA. Yang (2019) states that by looking at education from the viewpoint of AI development, the framework in China is proactively adjusting and planning for difficulties through elementary schooling and higher education. AI is starting to improve understudy learning and offer better help for educators, students, managers and principals by personalizing education, providing valid online educational platforms and reducing time consuming tasks such as grading and assessing and so on (Karsenti, 2019). Thus, because education prepares people for the future, exploring the feasibility of artificial intelligence in the field of education is a necessary and intriguing topic to be addressed, primarily in the context of the 21<sup>st</sup> century where AI is a growing trend worldwide.

## **PROBLEM STATEMENT**

However, current literature lacks in many important areas, which is constituting a barrier to the understandability of the scope of AI in education. Firstly, the ways can AI be utilized in schools especially during and post Covid-19 pandemic are not discussed yet. Secondly, how can AI aid students with learning difficulties has not been deeply studied.

Researchers are urging to cover these five areas. First, acknowledging the challenges, opportunities and advantages posed on students and teachers due to utilizing AI in educational institutions. Second, strategic recommendations that educational institution management offices must take into consideration concerning AI. Third, the ways AI can help school principals. Fourth, if AI is slowly but surely pushing towards smaller campuses. Fifth, calculating the true costs and ROI of implementing AI in the school.

## **RESEARCH OBJECTIVE**

The first basic aim of this study is implementing and integrating AI in education. Moreover, characterizing the challenges and opportunities allows decision makers to adequately establish strategic solutions to overcome the challenges and capitalize on the opportunities.

## **CORE HYPOTHESIS**

Since traditional education is not enough anymore, and with the assumption that education worldwide is tapping into the fourth industrial revolution, AI, what should the school's plan for the implementation of AI be? What are the opportunities and challenges that artificial intelligence can pose, specifically on MNS?

This hypothesis is broken down into three parts:

-Descriptive hypothesis: Hidden costs are high when many routine activities are still performed by teachers, employees, students, and all actors within the school instead of AI.

-Explanatory hypothesis: AI is a tasks efficiency tool and poor implementation of AI results is increasing the school's hidden costs.

-Prescriptive hypothesis: Building up an optimal model that is based on AI will reduce hidden costs and leave more room for resources to be spent on implementing AI technologies in the right way.

## **LITERATURE REVIEW**

The literature done on artificial intelligence has been extensive and addressed its historical development. Indeed, AI is not a phenomenon that was discussed in the 21<sup>st</sup> century. To the contrary, it has been a wide topic addressed prior with extensive research. The following section presents the extensive literature written on AI and its utilization in classrooms. This section is divided into three main parts. The first part conceptualizes AI comprehensively in an attempt to understand its depth. The second part discusses mainly the uses of AI. The third part juxtaposes AI in the field of education and how it can be used.

## **CONCEPTUALIZATION OF ARTIFICIAL INTELLIGENCE**

Bellman (1978) mentions that artificial intelligence is basically the technology that encompasses human-like features such as problem solving and rational thinking into digitized technological tools. Jarek and Mazurek (2019) and Wang (2019) reinforce these arguments and suggest that AI is the process of

digitizing human behavior to be used for various needs as a result of the development of cognitive mechanisms of AI. Wang (2011) mentions that an important feature of AI is called machine learning that provides unlimited opportunities. Machine learning refers to the technology's ability to address the overall experience it has been exposed to and create particular patterns that the machine learns from which in turn are translated into rational decisions.

It is key to note that Ashri (2020) mentions that AI is a highly sophisticated technological tool utilized for various purposes, that is constantly in exponential development, allowing for highly effective and efficient human like functions to be performed through machines for various purposes. In this sense, the research tackles the functions of the technology and its advanced tasks that are capable of assisting businesses in mainly daily and long-term deliverables. These tasks are considered features of AI that enhance the utilization of technology to incorporate responsibilities that people thought would be human exclusive. The use of AI has incorporated many different fields including business, marketing, security, and education.

Dignum (2019) mentions that AI indeed is the digitization of human functions to provide purposeful outputs to organizations and businesses. Consequently, issues associated with privacy and employment arise as part of the ethical considerations when utilizing AI. Privacy is associated with the unlimited access and organization of data collected on humans and employment issues are associated with the replacement of humans with AI since the technology is capable of having human functions digitized (Dignum, 2019).

Wu et al. (2014) and Lies (2019) address the concept of Big Data as being a large database that contains all sorts of information that can be utilized as content to create a well-structured marketing strategy based on the information provided. The whole idea of utilizing AI is that it provides organizations with data and information to make them well-equipped to create well-structured marketing strategies through major insights on market preferences attitudes, and trends. Luce (2019) mentions that AI through its major data input and insights has allowed organizations to have more accurate and precise strategies of targeting audiences.

## **USES OF ARTIFICIAL INTELLIGENCE**

The effectiveness and efficiency of AI have been highly recognized, particularly in its ability to extract data that is valuable for assessing human behaviors and patterns. From this standpoint, AI became an integral element to the marketing field and education. The findings of some studies suggest that AI contributes heavily to the businesses' knowledge on consumer behavior and purchasing intentions of customers through the collection of large numbers of data (Tchelidze, 2019; Huang & Rust, 2018). Hence, the content of the marketing strategies is highly derived from the data that is provided by AI.

Geru et al. (2018) suggest that AI is highly effective in the field of social media as it acts as a major platform for data collection and analysis. Geru et al. (2018) associate this concept with Big Data as it acts as a powerful tool for understanding consumer behavior, purchasing attitudes, and overall preferences. The whole idea of utilizing AI is that it provides organizations with data and

information to make them well-equipped to create well-structured marketing strategies through major insights on market preferences attitudes, and trends (Luce, 2019; Wirth, 2018). Jarek and Muzarek (2019) mention that AI has numerous functions that include data management, extraction, acquisition, withholding, and processing from multiple sources at a highly efficient rate particularly through proper task division.

The major use of AI in the fashion industry is in the marketing strategies of organizations. Struhl (2017) suggest that AI is a form of having organizations become more informed on market demands and accordingly, create their market strategies (it can be extrapolated to any market, schooling in this case).

Lies (2019) adds to Struhl (2017) that AI is highly utilized in the field of marketing through its big data functionality. By doing so, AI equips organizations, enterprises, and businesses with market demands and consumer attitudes and behaviors towards brands and products/services. One can notice that AI has the capacity to account for customer attitude, behavior and need. Since students are considered to be customers in a school, shouldn't we invest in systems that extrude and cast information around their individual skill sets?

## **ARTIFICIAL INTELLIGENCE IN EDUCATION**

The development of artificial intelligence has revolutionized many fields in any society. One of these fields is education in general. Garito (1991) addresses the impact of AI on the educational sector way before AI became as advanced as it is in the 21<sup>st</sup> century. Consequently, Espasito and Goh (2019) argue that AI's influence on education is positive as it enhances the cognitive structures of learning from assessment to teaching and learning. Goksel and Bozkurt (2019) also contribute to the literature on AI and its association and integration in the educational field by examining the use of AI in education and its future implications in the educational field, particularly through natural language processing (NLP), machine learning, and deep learning. Therefore, the future points of view on computerized reasoning use in education include adaptive learning, personalization, and learning styles, smart tutoring systems, and AI as a future component of educational processes.

Timms (2016) addresses the use of AI in education but from a more specific based approach that examines educational cobots and smart classrooms. Timms (2016) defines educational cobots as "a robot co-worker that works alongside humans to help them perform their work, so an educational cobot is a robot designed to support human teachers" (p. 703). Consequently, AI is perceived as an assisting tool to teachers and educators. Overall, this study assesses the effectiveness of AIED in different fields and concludes that future implications suggest its incorporation in the educational field as it contributes to a better overall assessment, assistance, and solidification of the different learning processes.

Lucking, Koedinger, and Greer (2007) address the impact of AI when integrated in the educational system. AI increases efficiency in demonstrating information, supports the understanding of learning experiences, accurate manifestation of results, and assists teachers throughout their teaching process in

terms of course preparation to delivery (Lucking et al., 2007). Lucking et al. (2007) also address the challenges that come with AI such as the difficulty in adopting it in the learning and assessment processes as it requires proper training for both, teachers and learners.

## **ADVANTAGES OF AI IN EDUCATION**

When the students spend time in school, they should be focusing on their creativity, exploring new things, building their communication skills, and solving problems. Firstly, AI acts as an assistance to teachers helping them in routine activities such as grading, evaluations, and tracking the performance of every student (Kashif, Junaid, Al-Fuqaha, Elhassan, Benhaddou, & Ayyach, 2020). Thus, when these tasks are made easy for students, teachers can focus more on course development, skills development, and teaching quality. For instance, companies like Carnegie Learning are developing learning platforms that enable AI driven learning, testing, and feedback to students. Secondly, nowadays teachers have great benefits from AI development, which makes it possible for teachers to create a new curriculum from scratch and automatically (Chen, Chen, & Lin, 2020). More specifically, teachers will spend less time searching for educational needs because they are outsourcing those tasks from AI. Hence, they will have individualized learning plans that help students learn at a pace that best suits their abilities and incorporate the content that is most beneficial to them. Thirdly, AI is assisting people with disabilities to make learning accessible for them (Shalini & Shipra, 2020). On top of these projects is Microsoft AI for Accessibility that is creating a digital conversational tool that helps blind students take tests more independently without the need for an in-test reader and writer. In addition to other games, chat bots, and live captioning service that are lowering the barriers to independent living for a special needs individual. In Vietnam, the 1<sup>st</sup> robot for education purpose has been launched and it can work as a teacher or assist teachers tirelessly to assess knowledge in lectures. What is exciting about this robot is its human-like engineering and personality, so it has artificial organs as well as sensations and a sense of humor making student engagement even higher than with other tools (Phong, Nam, Thinh, 2020).

## **DISADVANTAGES OF AI IN EDUCATION**

One of the main obstacles faced by faculty and administrative staff is the big knowledge gap when it comes to new technologies. For instance, deeply understanding the art of possible with AI or the leading edge in terms of using AI and machine learning like natural language generation, deep learning, neural networks, and all other applications. The second barrier is organization culture and mindset especially organizations that are not quite ready for digital transformation where there is a natural fear that AI might affect their job or transform what they do, so they must change their tasks (Fahimirad & Shakib, 2018). More specifically, AI applications are data hungry and require a lot of confidential data from students and faculty. This is where issues of privacy and

data protection come in where faculty members and tutors might fear an intelligent agent, or an automated essay scoring system might take their jobs. In China, systems are already introduced to monitor student participation and expressions via face recognition in classrooms and display them to the teacher and to the parents on a dashboard, so called Intelligent Classroom Behavior Management Systems (Shi, Peng, Wang, & Yang,2018). This system can be purchased, but this will decrease students' trust to their teacher because the students will believe that the teacher can now read their thoughts. Both teachers and students will not know who to believe. For example, the website <https://thispersondoesnotexist.com/> contains pictures of people who do not exist in real-life but created by AI. The issue is that students at young ages who will use similar technologies to write a story about the person in the picture for their English language class for example, might face delusion by mixing what is real with what is not real because simply they cannot visually distinguish.

## **CHALLENGES OF ARTIFICIAL INTELLIGENCE IN EDUCATION**

Like any new technology that previously invaded our world, we have to expect some pros and cons revolving around the use of AI and cognitive computing in our educational systems. Although AI is surely the trend and the future, experts in this field mention that AI and when used in education, lacks a lot when it comes to personal and emotional interaction between students and teachers, simply because AI and till now cannot mimic human emotions (Karsenti 2019). Popenici and Kerr (2017) directly examine the impact of AI on education and explore its effects on teaching and learning. The focus of this study is particularly on higher education. More specifically, Popenici and Kerr (2017) suggest that AI still fail to detect integral elements of the educational process such as irony, sarcasm, and humor that can highly be contributive to the learning process of students. Thus, Popenici and Kerr (2017) have emphasized the gaps of AI and its limits in terms of being fully integrated in the educational system. However, Popenici and Kerr (2017) did indeed address the efficient and effective advantages of utilizing AI in educational institutions, but primarily from an administrative and organization perspective and not in the entirety of the learning process.

Thus, by reviewing the literature, we notice that several gaps can be identified which this study is capable to fill and address critically. While the literature on AI is extensive, it has failed to contextualize artificial intelligence in schools in the Middle East, specifically in Lebanon. The literature is primarily western-centric and provides insights on its use in European, Chinese, and American schools. Thus, this study directly addresses the use of AI in the context of MNS which contributes significantly to the literature. Providing insights in the context of Middle East (Lebanon in particular) contributes as well to the literature on AI in general and its application in educational institutions in particular. Finally, as AI keeps on computerizing an ever-increasing number of routine undertakings, imbalance of schooling remains a critical obstruction to future open doors where achievement relies progressively upon innovativeness, sympathy, and having the correct aptitudes and information. This quickening change in technology brings up the basic issue of how to best get ready, from

kids to deep rooted students, to be fruitful and to prosper in the period of artificial intelligence. Therefore, we, as in schools, must train the new generation of talent to be skilled with AI. How can we do so? Simply start at the beginning by implementing this technology at the elementary, primary, and secondary levels.

## **PART 2: RESEARCH FIELD SOCIO-ECONOMIC APPROACH TO MANAGEMENT(SEAM)**

### **I. BACKGROUND**

Corporate strategies of the past were largely focused on the strategies of socio-economic nature. The challenge of survival of such companies was large, of which posed a threat to their development and their success on the long run, especially after the long economic crisis of 1973. The challenges that the companies were facing were of local and global nature and they were pointing out the need for the development of a new strategy that would relieve them of their crisis and preserve their competitive nature. The strategy management was proposing new approaches and models that were not focusing on the management itself, but rather on the aesthetics. For this reason, new practices were much in need to progressively build the new socio-economic strategy concept to management (Savall & Zardet, 2017).

In the United States, there has always been a rich history about organizational change and the development of work processes in corporations. This history was based on the works of people like Kurt Lewin, Rensis Likert, Douglas MacGregor, and Warren Bennis. Their works showed a different appreciation to a new approach in management, which was known as the Socio-Economic Approach to Management, first taught in the Socio-Economic Institute of Firms and Organizations (ISEOR), which started in 1973, the night of the long economic crisis. The SEAM approach is all about the offering of a new methodical, tested way that would assess the hidden costs in organizations. It disseminates the costs and practices that are found in management consulting whereby showing how the hidden costs within an organization are large and impactful. The core belief of SEAM is that organizations do not exist for the sole purpose of making money only. Organizations exist because they must serve the larger community that they are based on. They must serve the people and the employees of that company as well.

#### **i. Definition seam**

The socio-economic approach to management (SEAM) is one that provides a pathway for the creation of more responsive, responsible and productive organizations. Reflecting on the works of both Savall and Zardet, strategy implementation and strategy creation can be better framed through their discussion. The strategy development and implementation are reflected through the changing nature of the work and the workplace and are strongly developed through the potential power of the human potential. They both reflected that the western concept of human resources is often mistaken in meaning because people are not a resource to be exploited, but rather a resource to be invested in



with potentials that need to grow, develop, and nurture in order to become of great benefit to the corporation. SEAM is considered as a strategy that builds on economic and social performances. It provides through directions and incentives that guide managers to create and implement organizational effectiveness and efficiency. The SEAM approach to strategy is one that is grounded with innovation and creation. It is limited to the imitation of the market and the competition. It is illustrated through volume that revolves around the creation of an economic and social performance. It mixes information, tools, and techniques that are more focused about the organizational life and the illustration of having things done.

## **ii. Differences between seam and other methodologies**

In many different ways, SEAM can be considered as the regular, traditional Organizational Development. However, the SEAM intervention is about the creation of assumptions that would designate that different people see the truth and reality about certain situations differently from each other. It also focuses on identifying that all people need to be involved in change in order for change to occur effectively. The dysfunctions in an organization are solved through the identification process of SEAM that focuses on the five indicators of dysfunction. The different quantitative and qualitative approaches are the ones that are used in order to determine the hidden costs making SEAM different from the traditional approaches of OD and management. The five dysfunctions are hidden and not accumulated within the traditional balance sheet of an organization. Additionally, the loss or the profits are also not accumulated as part of the budget of the company. Normally, the hidden costs are the ones that need to be calculated within the profit accounting of the budget of the company, but they are not. They help the organization to make suitable decisions, but the less accurate data would not be taken into account if the critical factors are not available- for they shape the financial bottom line (Conbere & Heorhiadi, 2011). The hidden costs and the poor performance are a sign of the failure to be able to align the proper structures and actors' behaviors. The dysfunctions are a direct reflection of the failure of the management system, and the inability of the management team to listen to the customers and employees' complaints.

In a very different way, the British and the US management approaches to change emphasize more on the changing behavior. In the traditional French approach, there is more emphasis placed on the changing structures of management. The SEAM management focuses on the need to combine both approaches of the British and the French through focusing on change through the behavior and the changing structure in management (Savall & Zardet, 2017). Additionally, in the case when traditional management reaches a financial crisis, the result is often due to the actions of the managerial level. The way to respond would be through the factor of cost-cutting by downsizing employees to achieve the short-term gains. This is actually one way of proving effectiveness, but on the short term, and not on the long run. It also has negative implications because it hurts the organizational employees as much as it hurts the organizational performance. Therefore, the act is considered neither morally correct nor morally ethical to begin with because when the problem is due to the poor management of the company, it is morally wrong to fire people who are needed when the economy recovers. The main issue addressed would be due to the fact that almost

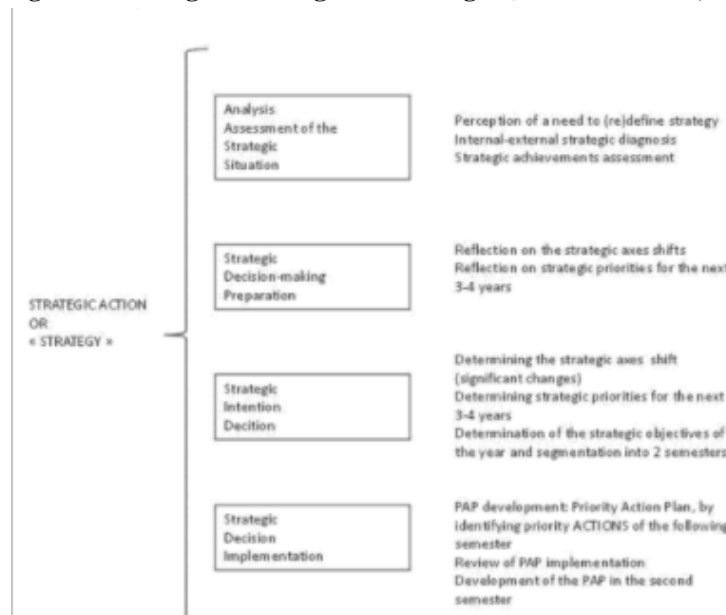
all management trainings are focusing on attaining profits and increasing organizational performance, and never focusing on attaining people and talents.

SEAM approach would be considered as economically feasible and effective only when employees are regarded as important human capital and indispensable for the performance and success of the company. Once the employees are retained, then the profits are increased. Another considerable difference between SEAM and other approaches would be that SEAM works as a holistic system that focuses on changing organizations and engages with all other systems of the organization. SEAM system is one that has a shared memory of 1200 interventions altogether, and a knowledge system that shapes the evolving SEAM interventions before and after they are made (Savall & Zardet, 2017). The database of SEAM can be used in order to detect the long term and short term problems within the organization along with discovering the trends of the problems that are found in the industry in general. The intervention of SEAM aims at leading the actors of the organization to examine what the hidden costs are and find new ways to allow employees within the organization to develop their skills, hence increase the performance of the company.

**Methodology: seam intervention process**

The SEAM intervention process is applied as an approach to medium and long-term strategic planning. The steps of the intervention process are often accompanied by a six-step approach utilized in organizations and companies (Savall & Zardet, 2017).

**Figure 1: Strategic Planning Process Stages (Savall & Zardet, 2017)**



SEAM process would be identified as an intervention that would uncover the hidden costs and make the necessary changes to increase organizational effectiveness. SEAM focuses on the importance of inviting the top management of the organization in order to be better equipped with the

intervention process of SEAM along with its influence over the organizational performance. After that, the second step would be inviting the consultants of SEAM to interview the top-level management actors, for a period of two hours, of which its main purpose is to illustrate the field-note quotes and the analysis of the root causes of the hidden dysfunctions. As third step, analyzed data would be collected and brought back for discussion at the top management levels in order to create a mirror effect. The data would be used to indicate where changes need to occur and where hidden costs are found and have not been added before. The top management team would use this data to indicate where the organization has been lacking and where its potential is not being fully reached. The data would also create a response of which indicate the extent of change that needs to happen. The leaders, in this case, would realize that the hidden costs are actually a missed potential that needs to be accumulated for. Finally, the mirror effect would take place through three folds. The first would be through the leaders agreeing on working on projects that would reduce the hidden costs. The second would be through having the leaders become more supportive of their employees and their human capital and help them in correcting the hidden costs and reducing them. The third would be through the top leaders beginning the process of change. It happens when managers realize that directive management is the one that will shape the organizational change and would be changing the roles of the top managers as well (Savall & Zardet, 2017).

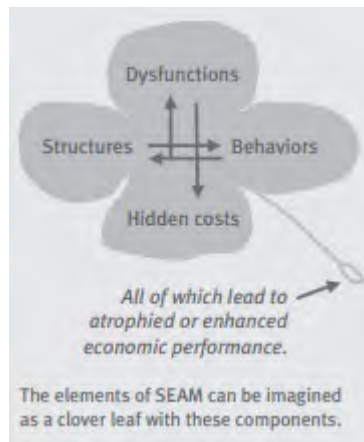
In the end, the SEAM approach would work best through the shift in organizational beliefs. Once employees start believing that their environment will change through improvement, then they will seek to improve surely (Paul, Robertson, & Herzberg, 1969).

### **1. Six management tools of seam**

The six management tools of SEAM are those that ensure that change drives the management process.

The first takes place through the internal and external strategic action plan, that is a three to five-year plan that allows the main actors to know where the direction of the change work is needed and how the roles of the people will be distributed. The second occurs through an Action Plan that prioritizes the change work through half a year and identifies new values and tasks that need to be implemented. The third tool is the use of the competency grid that assesses the skill level of each of the corporation employees and actors in order to make sure that they are well trained and ready to implement the change and the new activities. The process would take place not through firing people or downsizing the company, but rather through investing more in the potential of the people and shifting the attention towards the change that needs to take place. The fourth tool is the time management tool that helps to assess how well actors are using their time with great efficiency. The fifth tool is the piloting logbook that is a tool for measuring the results in relation to the value given through management changes. The final sixth tool is the contract that is both periodical and negotiable, which aims at adding extra effort to the implementation of new activities.

**Figure 2: Elements of SEAM (Conbere & Heorhiadi, 2011)**



## **2. Seam diagnosis phase**

The diagnosis phase is considered among the most labor-intensive stage of all because it requires the most time out of the majority of the consultants' time. The diagnostic located within the top management group would be to identify and work on the projects that would be used in order to convert the hidden costs. It is the role of the SEAM consultants to facilitate these projects, while at the same time they will be going through the diagnosis phase in the lower management part of the company. This is referred to as the *Horivert Process*, which means that it is the work that needs to be done with the leadership team. It is cascading down through the hierarchal flow chart, while more working with other teams, members and groups during the vertical phase. As the intervention process takes speed, the *Horivert* process is the one that is shaping the next steps. Therefore, the leadership group is the one that chooses their project. They embark ownership over the need for change and work according to their level of operation (Buono & Savall, 2015). The SEAM process takes place through the vertical silos. The process starts top down in the order for diagnosis, mirror effect and projects that formed through the actors. The vertical diagnosis would happen through determining the extent of the hidden costs and the underperformance of the organization. The tools that are used in the vertical silos would be also documented in the ISEOR database.

## **3. Seam hidden costs concept**

The five indicators for hidden costs are absenteeism, occupational injuries and diseases, staff turnover, non-quality, and direct productivity gaps. The data would be collected and analyzed through which the extent of it would be determined. As a result, the SEAM intervention would give the organization detailed feedback on a solid data that would help to determine the extent of the losses accumulated from the hidden costs and the poor performance of the company (Savall & Zardet, 2008). The important part of this would be the change that the leaders would be performing. The employees as well need to abide by the process of change in order to be rewarded. The employees need to have a strong and firm belief that their environment will change once the

intervention succeeds. Therefore, the main task of the SEAM consultants and the upper managers of the company is to create a realistic scope for the employees to abide by in order to help reach the corporation goals and really be able to make a difference (Paul, Robertson, & Herzberg, 1969).

As a result, the change would be assessed later on in order to determine the financial consequences. These consequences are assessed based on five main financial concepts: excess salary, overtime, overconsumption, non-production, and risks. The excess salary would be all the additional salaries that are paid for the high salaried actors. The vertical working groups are those that are exploring the dysfunctional stages of finances and that are identifying more than 1200 approaches to interventions. Through the mirror effect, the SEAM consultants would be able to see the results of their work and project it back to the employees (Conbere & Heorhiadi, 2011).

#### **4. Advantages and disadvantages of seam**

The SEAM approach is very different from the organizational change because it requires huge investments in energy, time and resources along with changes in programs that require large amounts of expectations. The estimation of the success levels is as low as 10% in the case of the traditional organizational development. Therefore, the most successful and advantageous approach to change management is the SEAM approach. Despite that SEAM might look like an approach with only two main foci, the people and the economy, yet it is very much successful due to the fact that it originates with the same word combining two foci, socio-economic. The advantage of this approach is that it is exploiting the use of ideas like organizational dysfunction that is leading to hidden costs, organizational tasks that are set in order to develop human potential, and finally, uncovering the hacks of poor management which are the major cause for dysfunction (Savall, 1981).

The validity of the information is also checked and understood through data triangulation. The SEAM focuses on human potential, adjusting poor management, and deriving that poor management is the root cause of all major dysfunctions that occur within an organization.

The disadvantage of SEAM is that there are not enough courses in the US to teach it in the first place. Second the methodology of SEAM calls for a testing theory and not multiple case study approach, which is often complex and changing situations in the human organizations. The methodology cannot have the researcher generalize the findings also to a larger population, which render the methodology a complex and long process. Finally, replications cannot be assumed that the theory is valid. New research must be uniquely conducted for each company (Conbere & Heorhiadi, 2015).

#### **Poor AI implementation**

AI is a tool like any other technology, which should facilitate teachers' job and make it more effective. One of the goals that will help MNS implement AI is lowering costs. Expanding the reach of MNS workforce both in admissions office and marketing office using AI to help multiply that force out even larger. Thus, making those extra humans to interact with students, build relationships with them, and allowing some FAQs to be filtered through AI. In addition to increasing access to the institution, faculty members will be able to increase the

number of assignments they could potentially grade using AI tools. Thus, growing the strength of the instructor and allowing them to maintain personal relationships with students because they are spending less time going through those basic assignments. In addition, beside content, AI will help students acquire a skill set of curiosity, collaboration, critical thinking, and problem solving because they are interacting more than looking at a book or just listening into teacher. Although digital technologies are extremely helpful to deliver contents, the learning experience is a complex challenge specifically social experience tends to be highly embedded into education. For example, Amazon was testing an AI HR bot to pre-scan candidates, but it had to abandon it because it was adopting the biases of the HR managers it was studying (Lee, Resnick, & Barton, 2019). Hence, with poor AI implementations, organizations can institutionalize to their harm and regret the bias, sexism, and racism of the people that the AI bot studies. With the application of SEAM methodology in education, students cannot be considered a laboratory to test if the machine has learned correctly or not because. Consequently, any mistake in this area will result in a disruption of students' learning journey, a waste of their time and teachers' time, and a waste of money on the AI development. Similarly, on the staff level, one of the hidden costs is internal communication issues resulted from wrong information shared by the AI. In addition to the creation of a work environment that lacks trust if the decisions taken by the AI are wrong, resulting in work double check by humans which in some cases may require tasks repetition leading to higher hidden costs. Most importantly, the strategic SEAM plan should be based on a system that recognizes more than the standard things that staff can recognize at the moment. For instance, the main reason for underperforming at school is the student not studying. However, usually there are common indicators among underperforming students that point to the reason why students are not studying. Also, in the post pandemic education when students return to school, adaptation is going to be incredibly difficult to any teacher. The reason is that no matter what is happened for the majority, every child had a different experience and have learned different things in a different way. Thus, the teacher cannot diagnose and support all those amazingly different things, yet here what AI can do. On the managerial level, the most important thing is to recognize what is AI good at and what is not good at, what human beings are good at and what they are not good at leading to a sort of complementarity between human beings and AI that sets the line in decision making. As a result, AI does not evolve to the extent of making critical decisions on behalf of human beings. Finally, the application of AI with the SEAM approach will entail all stakeholders especially parents who always fear any change in the educational system. Beside readiness in infrastructure, the school will mentally and technically make its stakeholders knowledgeable of the scope of AI as a tool that with the help of teachers, students, and parents will push learning up to the next level. The plan will be similar to the Finnish approach to learning by educating 1% of the population that this 1% will educate and train other groups to eventually reach the 100% target. In this matter, the school will rely on different kinds of assessments depending on personal, cognitive, and behavioral abilities.

## **II. IMPORTANCE OF SEAM, STEPS OF RESEARCH, AND USES IN RESEARCH DESIGN**

### **1. Seam model change management**

The Qualimetrics Approach is considered as the SEAM Change Management where it proposes a challenging and new way of thinking about analyzing organizations, all of which show how the quantitative information, financial analysis, and the qualitative insights work together to create organizational dynamics. In order to gain the best understanding of companies, the intervention would take place through a focus on three main perspectives that would lead towards ignoring the incomplete understandings and focusing on the importance of using the quantitative depictions for organizational performance. It would even more help in understanding the construction of the financial statements (Savall & Zardet, 2011).

### **2. Seam and application to private schools improvements and dysfunctions, reduced hidden costs, and others**

Performance, productivity and quality can be improved using SEAM in all different corporations and businesses, like public and private schools. Since the socio-economic approach to management focuses on the human side of the workplace, it will be able to develop the potential of human capital in all schools in order to make good use of the energies of the people. Additionally, it will set long-term goals because it will help create investments that are more engaging and more demanding from people, helping them to positively contribute to the environmental changes in the school. It will also have the power to monetize the dysfunctions. It will create a more holistic approach through an intervention of top management of the school that will later on cascade to the remaining people working in the school. The process will start through interviews and through the collection of witnesses, which will end in the formulation of key ideas and pivotal ideas that are important for analyzing and determining the change that needs to occur in the company.

### **3. How can seam (as a change model) as a methodology help to transform MNS and integrate AI. In addition to improvements and dysfunctions, reduced hidden costs, and others**

#### **a) THE CHOICE OF ORGANIZATION**

Monsif National School is an 83-year-old private trilingual (English, Arabic and French) coeducational institution for primary and secondary education. It is officially recognized by the Lebanese Ministry of National Education and Fine Arts. It also offers a High School Program to all non Lebanese and Lebanese students who have spent two or more uninterrupted academic years abroad in schools that follow either the American or the British program. The school admits students regardless of race, color, religion, gender, disability or national origin. MNS lays special emphasis on preparation for admission to high standing universities in Lebanon and abroad.

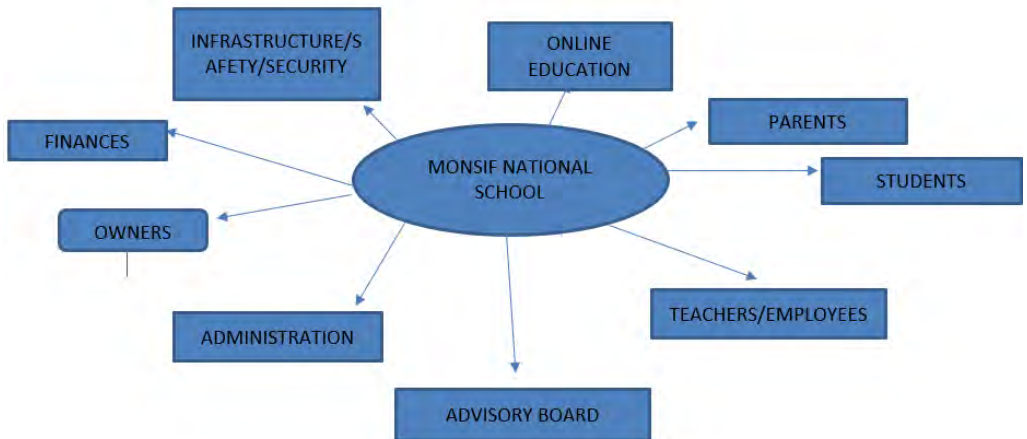


Figure 3: M.N.S internal and external divisions

### b) The methodology

There are things in life that cannot be replaced, the biggest irreplaceable one of all is the human being. With the evolvement of technology and with the emergence of smart computational systems, the question that is frequently asked now is to what extent can computers and smart systems replace human beings. A lot of jobs have been threatened by technology, mainly routine based jobs. There is no question that Covid-19 pandemic accelerated the propagation of technology and forced humans all over the world to rely more on virtual based platforms rather than a person to person based dealing. In this project, I am interested in the educational sector mainly the schooling sector. All the work through the duration of the project will be performed at Monsif National School (MNS). One thing to keep in mind, is that anything related to artificial intelligence (AI) or cognitive computing is more expensive than that of the systems that lack these technologies (i.e.: traditional education). With AI being the new trend and with the global economic crash, the task here is how can we work on improving the quality of education, removing barriers, adding technologies and delivering that service with a competitive price that meets our socio-economic status. In schools we are building humans, what happens if we allow computers to build humans rather than the other way around. Thus, we approach this research keeping in mind, as a rule of thumb, that AI systems to be discussed will be used to optimize a human's life within this organization as MNS believes that humans are the most essential and technology should be facilitated to aid a human's mental growth not stopping it.

The methodology that I will be using is the socio-economic approach to management (S.E.A.M) for the following aspects:

- 1- Identifying dysfunctions and hidden costs at MNS under the normal pre-covid19 pandemic.
- 2- Identifying dysfunctions and hidden costs at MNS under the normal post-covid19 pandemic.



- 3- How can SEAM methodology smoothen the transaction from traditional education to nontraditional ways.
- 4- How can SEAM methodology help transform MNS to the AI era.
- 5- Using the lenses of SEAM, how can AI improve dysfunctions on all levels in the school
- 6- Using SEAM how can we assess root causes and cure them.

**c) Proposed steps in this project**

**Figure 4 shows the steps followed by MNS in this project**

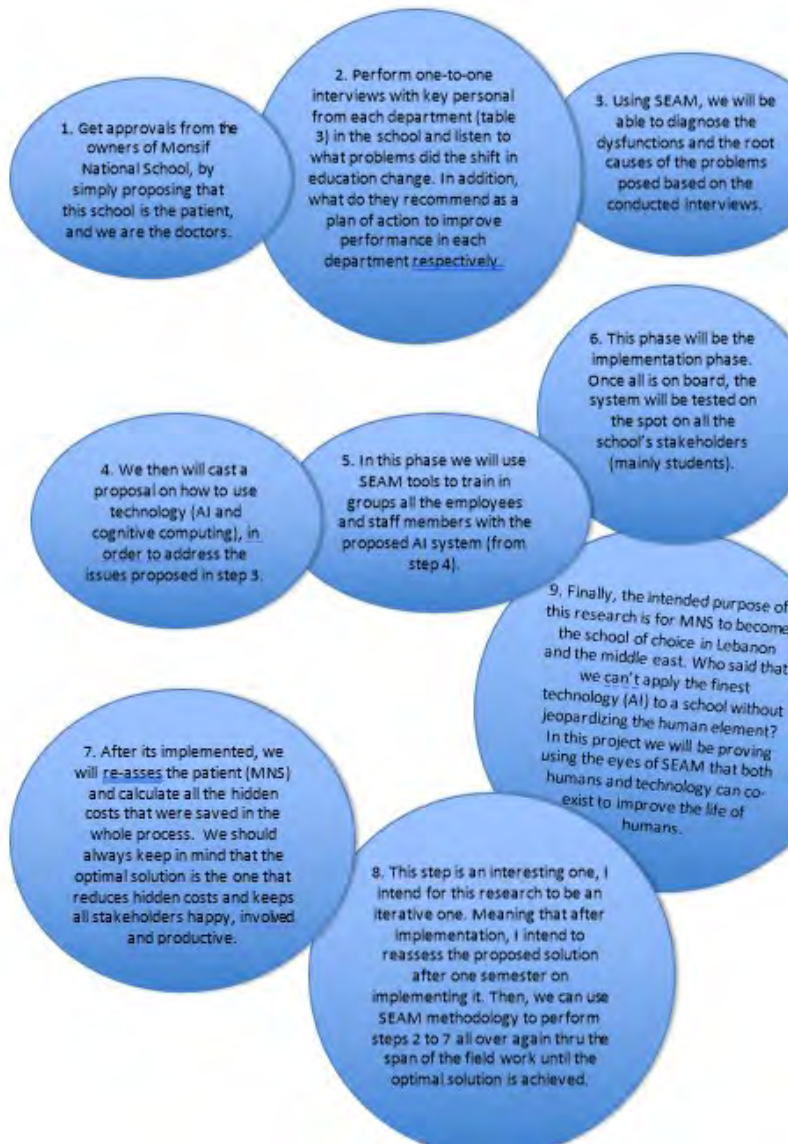
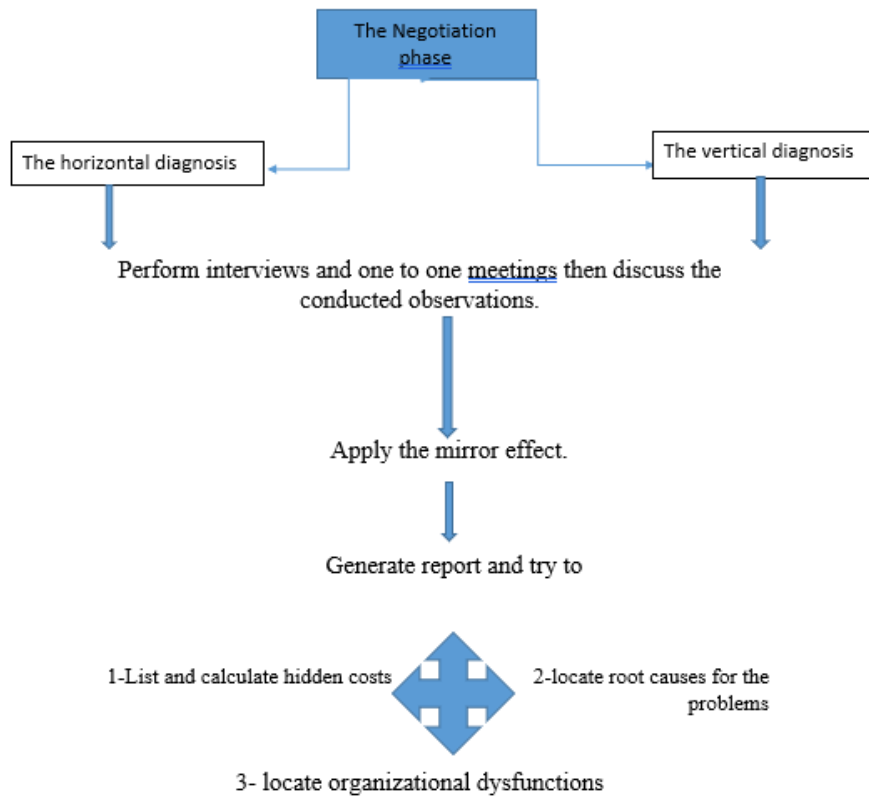


Figure 5 shows in a small drawing the mind map that was clearly stated from steps 1-9.

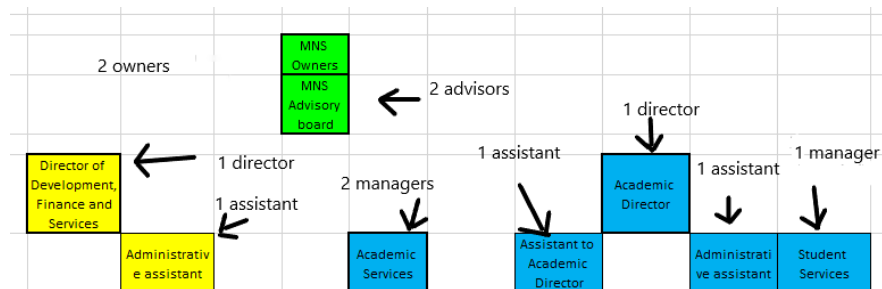


#### d) The work in progress

As part of the qualitative research, 12 interviews on the horizontal level (figure 6), initially exclusively for mid-top levels managers, have been conducted. Noting that all employees in the organizations from managers to janitors are considered *actors* in the school according to Savall and Zardet (2008). Each interview was done on a one-on-one basis, and the average interview took between 60 to 85 minutes. These interviews have been literally written, meaning on a word-by-word basis, to apply the SEAM methodology. The approach of qualitative data collection is called the phenomenological method when the researcher attempts to gain insight into a universal feeling or experience (Mortari, 2015). Qualitative data at MNS was collected from interviews and mirror effect observations where the researcher was interested in the individual experiences of the actors regarding MNS dysfunctions. After the interviews were done, the researcher looked back through them searching for patterns that reflect the universal nature of experience over the 6 categories of dysfunctions. Out of these 12 interviews, 366 witness sentences that indicate different kinds of dysfunctions among the 6 previously mentioned categories have been diagnosed. The application of SEAM has enabled to formulate themes

and sub-themes from the 366 witness sentences. These 366 witness sentences have been turned into 100 key ideas by studying the frequency of occurrence for each witness sentences in all the interviews, hence getting quantitative data. Here the phenomenological perspective applies by turning the content of the interviews into trends in the data. Afterwards, the 100 key ideas have been eventually converted into 25 pivotal ideas that have been sorted out in a way that covers all the details reflected from the witness sentences. Finally, based on those 25 pivotal ideas, 3 projects are expected to come into where the school needs to set some well-defined objectives on different levels. Firstly, project 1 covers everything related to communication inside the school and between the school and the external world. Secondly, project 2 entails all the HR related matters from policies, incentives, recruitment, and task distribution. Thirdly, project 3 is all about the ownership vision, rolling projects, and long-term plans and investments.

**Figure 6: MNS H Chart on the Horizontal level**



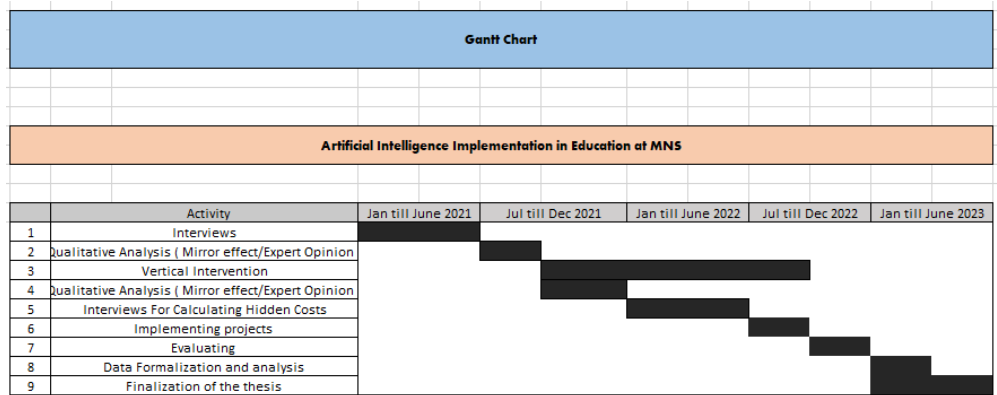
**e) Mirror effect**

For the purpose of putting these three projects into action, a 33-slides PowerPoint presentation has been presented in front of the 12 interviewees to reflect the horizontal mirror effect. The whole mirror effect took around 140 minutes between a 50-minutes presentation and 90 minutes discussion. The importance of the mirror effect is carrying out self-examination for management by presenting those sub-themes and pivotal ideas. Managers were exposed to the fieldnote quotes or witness sentences during the process of mirror effect to validate the dysfunctions in the major three identified areas. Thus, in addition to the witness sentences collected during the individual interviews, data was collected through observations from the actors' reactions happening all over the mirror effect process. The presentation displayed the whole intervention research steps that have been so far accomplished, summarized key witness sentences that are said by the interviewees and showed the pivotal ideas. Also, this presentation provided a thorough explanation of the major dysfunctions that MNS is passing through and displayed the three projects that describe those dysfunctions. Firstly, all the actors were grateful and happy that the dysfunctions that they discussed during the interviews have been heard and took into consideration, which made them feel that they are important to the success of MNS. The audience composed of all the 12 interviewees who fully attended the presentation, was positively engaged with the presentation by reinforcing on those fieldnote quotes. Secondly, hearing all the dysfunctions said in few minutes combined with the opportunity cost of those dysfunction on the school made the actors raise their

voices even higher. In sometimes they were angry because they love the school, and they did not realize until the mirror effect day that these dysfunctions are making them stuck from improving. On one hand, all the actors were annoyed from the non-existing documentation and job description at the school as they insisted to find a solution for this issue as soon as possible. On the other hand, conflicts in actors' opinions that happened during the mirror effect led to getting into more details through constructive debates, which makes orchestration between different departments to solve multiple dysfunctions even smoother because the real issues have been revealed. All over the discussion period, the SEAM methodology saw the light especially by bringing out delegation. This delegation has been highlighted in actors' empowerment and eagerness to work within teams with deep understanding of the team's goals since they will be designed by the actors themselves. During the discussion that was sometimes happening on the spot after a certain key idea in the presentation, actor 4 was upset because of the lack of trust and work organization. While actor 2 raised his voice about how lack of documentation and communication are exhausting the way they are going now. However, actor 3 emphasized the importance of justification and executions of laws, so each person will execute his/her authority. Nevertheless, whenever an actor was showing how much their work was hurt due to a certain dysfunction, he/she was instantly providing solution to the issue. All the attendees became more excited to reveal more details since they have been astonished that their words were considered, and their opinions were voiced. Thirdly, everyone agreed to be part of the solution, so each actor from their own position proposed solutions to all the major three dysfunctions' areas. More importantly, all the actors were enthusiastic because they felt valued as they are making difference at MNS, and the audience fully agreed unanimously that these problems exist at MNS and proposed solutions need to be implemented. Also, delegation reappeared in the mirror effect process when each actor was able to provide solutions to all the major dysfunctions after successfully proposing solutions to the dysfunctions in their own area of work. Finally, everyone reassured their love for the school, and they reflected their eagerness to cooperate as they believe that MNS will become "the school of choice" if it is cured from these dysfunctions while continuously updating its plans.

**f) Gantt chart**

**Figure 7: Timetable featured in Gantt chart with realistic milestone for work completion**



### **g) Discussion**

Based on that and after agreeing that these three projects are good representatives for MNS' dysfunctions, the audience has decided to be part of the solution. For this purpose, they suggested to form groups to come up with a plan combined with a timeline of implementation. This presentation was fruitful especially with the priceless engagement of its attendees who showed commitment, openness, and responsibility to unify their efforts for the sake of the school. All of them showed their love and dedication towards the past, present, and future of MNS as a school that believes always and forever in the human capital. The teams will be composed of interviewees 7, 9, 10, and 12 to spear at internal and external communication in team 1. In team 2, interviewees 3, 5, 8, and 11 to enforce HR policies, rules, and regulations. In that matter, interviewee 3 will be functioning as a guidance with HR and communication. In team 3, interviewees 1, 2, 4, and 5 will be working on a more aligned vision and backing up with the design and implementation of the three mentioned projects. Finally, interviewee 6 will oversee the application of the whole process on the ground inside the school.

### **CONCLUSION**

The SEAM approach is an effective intervention that demonstrates the importance of reducing costs and developing human potential, while also improving the morale and profitability of any corporation. It is largely effective when the intervention involves the collective efforts of all the organizational system. In order for SEAM to effectively work within the company (school in our case), it is important to be first accepted by the top management. After that, the changes are to be embraced by the whole company, all of which constitute the heart of the SEAM process. If more companies abide by SEAM, then more companies will become more productive, and their employees will become more satisfied with the overall work process. We are looking forward to implementing SEAM at MNS and we cannot wait to see the positive impact that it will generate on all levels of this organization.

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