

The Societal and Educational Transformation Projects The Middle East's Educational Construct-The Case of the Lebanese Specific Diverse Educational System (LSDES)

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Keywords

Lebanese Educational System, Cosmopolitanism, Heritage, Artificial Intelligence, Transformation Manager's Profile, Enterprise Architecture and Critical Success Factor.

Abstract

This paper uses the author's Applied Holistic Mathematical Model (AHMM) and specific research and development approach to support activities and decision making (Trad, & Kalpić, 2020a) in the case of the Lebanese educational system. The historical nation of Semite tribes has influenced humanities and their corresponding civilizations for thousands of years. Their legacy includes, education, culture, seafaring, commerce, arts, languages, sciences, creativity, perseverance, and many other fields. Their migrations, curiosity, talent, and their unique holistic vision on major domains of evolution, culture and education, made them transform the Middle East Area (MEA) and other parts of the world; these transformations made humanity advance. This intellectually curious nation includes the: Arameans, Hebrews, Phoenicians, Akkadians, Arabs from the Arabian Peninsula (AAP), Babylonians, Assyrians, Syriacs and other Yemenite tribes. These tribes initially inhabited the lands of Shem (bilad el -Shem), drawing their common origins from the southern Yemenite inlands. They are probably the oldest structured, globalized, and networked civilization that established the first global communication infrastructure and educational eco-systems. They have chosen the Middle Eastern Area (MEA) and the Mediterranean Coast (MC) as a jumpstart for their unique and fulgurant expansions, to reach various parts of the world. Their innovative temperament, culture, discipline, skills, and education, enabled them to develop complex domains, like, technology, maritime navigation, massive constructions, architectural undertakings, the evolution of monotheistic religion(s), alphabet (abjad), evolution of language(s), pure and applied mathematics, sciences, commerce, networked finance, and many other fields. These fields were originated and developed by this exceptional and enduring nation of tribes, which used Aramaic as their lingua franca. From their origin until today, they faced many fatal challenges, confrontations, genocides and even risks of extinction. As the targeted subject is complex and inflammable, the focus is set on the Semite-Phoenicians (SP) or the modern Lebanese, their complex heritage, and their specific educational and multi-cultural system(s). SP's heritage, education, and culture has spread throughout the MEA and much further. SPs inhabited the region of Lebanon that extended from Tyrus to the Nordic city of Tripoli; knowing that since thousands of years, Lebanon designates a region and is only country that has never changed its name. SP city states were avant-garde posts for their expansion in the world to reach the Americas. These well-organized and unconventional expansions brought them cultural, societal, economic successes and have done major changes in the newly discovered regions. This paper's presented facts gave the Lebanese societal advantages that are felt in their Educational System (ES) and this paper will try to present the Case of the Lebanese Specific Diverse ES (LSDES).

Introduction

SPs, Amorites, and Hurrians are categorized as Canaanites and that are Semites (iGENEA, 2022). SPs have: 1) A universal nation's approach, where they are promoters of a global culture of peace, culture, and development; 2) A broad world concept, as they experienced and learned to relate to other nations and cultures; 3) An open minded rich political and diplomatic skills, and they can adapt to different climates and geographic environments; 4) Not ethnocentric mentality and have a culture based on

knowledge; and 5) An environment of letters, alphabets, books, libraries, inventions and discoveries, and scientific, philosophical, and religious thinking. From their habitat, shown in Figure 1, they form a nation that lived off knowledge and they spread global culture in the MEA, MC and the Atlantic Ocean’s coasts. They are the first who gave the notion of identity to a large part of the world through their various activities. SP’s culture is the fundament of the MC’s culture and today we can still identify the continuity and evolution of the SPs thought process, like culture and education. SP’s approach to education is based on their affinities (or cosmogony), and they are educators, inventors, researches, and discoverers and willing to spread their knowledge. They developed important skills and organizational methods that made them great educators/teachers in various fields like diplomacy, navigation, law, and other. This essentially influenced the education of young people who received instructions to become creative in production activities, navigation/trade, politics, and diplomacy (ACW, 2018). In fact SP’s affinity for education is historical, and already in the 3rd Century (AD) an international school of law and jurisprudence was constructed in Byrut, which reached high distinction, and Gibbon noted that it furnished the eastern Roman provinces, with pleaders and magistrates for three centuries, from 250-550 (AD). The five years course, included Roman Law, and pleaders could choose to study in Byrut, Rome, or Constantinople (Phoenicia.org, 2022a). SP’s approach to education can be optimal for the development of cross-functional profiles, specialized for complex projects.



Figure 1. Ancient Phoenician map (ACW, 2018).

This paper analyses the LSDES and uses the Applied Holistic Mathematical Model for LSDES (AHMM4LSDES) to support the Societal/Educational Transformation Project (or simply the *Project*). The AHMM4LSDES is based on many years of research on: 1) Education, business, technology, and societal transformation projects; 2) Artificial Intelligence (AI); 3) Applied mathematical models; 4) Information system and Software modelling; 5) Cross-functional skills needed for complex projects; 6) Financial analysis; 7) SP’s origins and evolution; 8) Multi-culture and didactics in education; and 9) Enterprise Architecture (EA), standards and methodologies. The author presents the Research and Development Project (RDP) that is based on his proprietary methods that are supported by a qualitative reasoning module, the Heuristic Decision Tree (HDT).

IT Architect Roles	Architecture Board Member	Architecture Sponsor	IT Architecture Manager	IT Architecture Technology	IT Architecture Data	IT Architecture Application	IT Architecture Business	Program or Project Manager	IT Designer
Legal Environment									
Contract Law	2	2	2	2	2	2	2	3	1
Data Protection Laws	3	3	4	3	3	3	3	2	2
Procurement Law	3	2	2	2	2	2	2	4	1
Fraud	3	3	3	3	3	3	3	3	1
Commercial Law	3	3	2	2	2	2	3	3	1

Figure 2. The Open Group’s skills’ framework (The Open Group, 2011a).

The LSDES offers recommendations and the optimal *Project Manager's* (simply the *Manager*) profile, which extends the profile of the Architect of Adaptive Business Information Systems (AofABIS) or the technocrat's profile (Trad, & Kalpić, 2014a; Farhoomand, 2004). The *Manager's* profile is the author's research focus. For *LSDES' Manager* the AofABIS must be complemented with specific academic and hand-on skills, like: Didactics, educational curricula, pedagogy, AI, Information and Communication System (ICS), and Methodology/EA skills... Complex environments, can be managed by a *manager's* profile, which basic EA/ICS skills are presented in Figure 2. There are many methodologies that can be used to support *Projects*. In *Projects* the role of ICS is determinant and Digital Transformation Concept (DTC) is common to all types of *Projects* (Gartner, 2016). Unfortunately, *Projects* have a high failure rate, because they lack a holistic approach and that the *Manager*, a specific educational curriculum. A *Project* uses Critical Success Factors (CSF) and Critical Success Areas (CSA) which are managed by the author's framework and are used to analyse the *LSDES*. This paper the Lebanese ES, which is regulated by the *Lebanese Ministry of Education and Higher Education* (MEHE), focusing on complex domains like ICS and engineering domains. In Lebanon, academic organizations (simply an *Entity*) use the following languages: French, English, Arabic, and the Lebanese dialect; these languages are used in early years in schools. English and/or French are mandatory for mathematics and sciences in all *Entities*. According to a 2013 World Economic Forum report, Lebanon was ranked 10th in overall quality of education and 5th in science and mathematics (Bahous, Bacha, & Nabhani, 2011; The World Bank, 2006; Bilbao-Osorio, Dutta, & Lanvin, 2013). This RDP will try to present MEHE advantages and disadvantages.

The research and development project

The *LSDES* sets of CSFs are: 1) The history, role and origins of the *LSDES*; 2) The geopolitical influence on the *LSDES*; 3) The societal, religious-ethnic, and cultural predispositions; 4) Evolution of the levels of culture and standards of life; 5) Educational standards and the national system; 6) Interaction with external academic organizations; 7) RDP' and the related framework statuses; 8) The focus is on complex engineering fields, like the ICS; 9) SP's affinity and influence; and 10) The *Manager's* profile, which is the most important CSF. Actual *Projects* are managed as silos where their components create a messy system that is based on educational and technological sub-systems. The AHMM4LSDES based Decision Making System for *LSDES* (DMS4LSDES) can be used to solve *LSDES* problems, by offering sets of solutions. Problem solving uses a central qualitative method that is based on an HDT process, which uses quantitative methods at its nodes. AHMM4LSDES and the author's framework are domain driven and is agnostic to a specific *Entity*, methodology and technology (Trad & Kalpić, 2020a; Trad, 2021a, 2021b).

The Author's Framework and the RDP

RDP's concept is managed by the author's framework or the *Transformation, Research, Architecture, Development framework* (TRADf), which is composed of various modules. In this paper, parts of the previous author's works are reused for the better understanding of *TRADf and LSDES*, like: 1) The Educational Transformation Project's Remote Group Work (Trad, 2022a); 2) The historically recent Rise and the 1975 Fall of the Lebanese Business Ecosystem (Trad, 2019a); 3) The Business Transformation Framework and Enterprise Architecture Framework: Organisational Asset Management in the Lebanese Context (Trad, 2021a); 4) The business transformation enterprise architecture framework for innovation: The role of artificial intelligence in the global business education (Trad, 2021b); 5) The Selection, and Training Framework selection and training framework for *Manager's* in Business Innovation Transformation Projects-Educational Recommendations (Trad, & Kalpić, 2014b); 6) The transformation framework The role security in the global education system (Trad, 2021c); 7) The Societal Transformation Framework: The Nation of Semites-The Phoenicians (Trad, 2021d); and other works. In this paper the aim is to upgrade the AofABIS profile that become the *Manager* complex projects. Empirical research validity checks if the RDP is acceptable as a contribution to existing scientific knowledge and uses a Proof of Concept (PoC) or experiment, to prove that the resultant recommendations are valid. Using Google's scholar portal, in which the author combined the previously mentioned keywords and key topics; the

results clearly show the uniqueness and the absolute lead of the author's *TRADf*; which makes the author's works' credible, successful and useful. In the initial RDP phase, *TRADf* has to be tuned for the Research Question (RQ).

The Research Question, Research Limitations, and Knowledge Gap

The application domain are ICS and engineering domains, and the *Manager's* profile must include the following skills for managing: 1) Agile, and EA environments; 2) Business architecture; 3) Team members' integration; 4) *Project* management; 5) Integrated development environments; and 6) Coordination of implementation of *Project* modules. The RQ is: "What are the advantages and disadvantages of the *LSDES* in ICS related fields?" An important research gap and limitations exist, that is why the author proposes a holistic approach that unifies the following fields: 1) Implementation of a unique *LSDES* for ICS; 2) Define the *Manager* profile; 3) *LSDES's* interaction with other external *Entities*; 4) To use an *DMS4LSDES*; 5) To educate to localize Global Organized Financial Predators (GOFP); 5) Empirical Engineering Research (EERM) model and the use of CSAs and CSFs management.

EERM, CSFs and CSAs

This RDP is based on the EERM and it includes a PoC that is based on Action Research (AR), HDT, and CSAs (Easterbrook, Singer, Storey, & Damian, 2008). AR is an optimal method for Professors and researchers, academic staff... Especially, AR is helpful in education and can be defined as the process of learning process that improves the quality of the educative system. AR provides the academic staff with valuable knowledge and technics on how to improve educational practices or resolve problems. AR uses a systematic and participatory process and offers beneficial opportunities for Professors. AR supports the professional development of Professors, by increasing their empowerment, and linking research and practice (Hine, 2013). As shown in Figure 3, a CSA is a selected set of CSFs, where a CSF is a set of Key Performance Indicators (KPI). Each KPI corresponds to an *LSDES* requirement and a problem type. CSFs reflect *LSDES* problem types that must meet defined *Project* goals. Once the initial set(s) of CSAs and CSFs have been identified, then the *Project* can use the *DMS4LSDES* and standards to propose solutions (Trad, & Kalpić, 2020a).

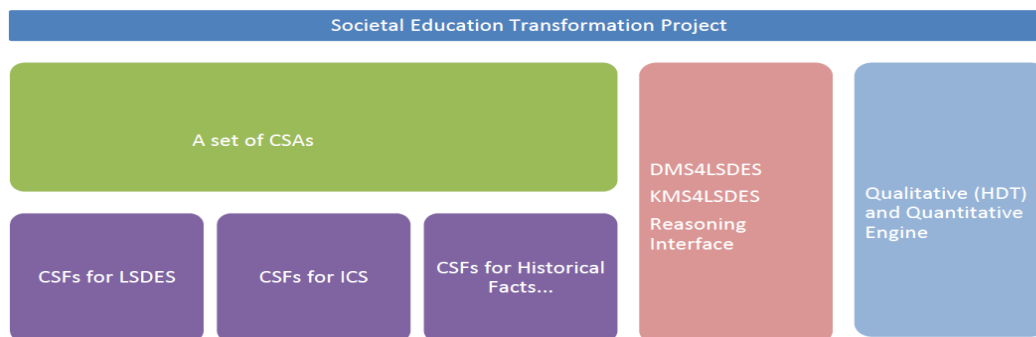


Figure 3. The CSA and CSF concept.

AI, Standards and Frameworks

TRADf interfaces standard frameworks like, The Open Group's Architecture Framework (TOGAF) that supports EA and AI activities, to support intelligent behavior, by analyzing the system (European Commission, 2019). AI includes the following fields (McCarthy, 1989): 1) Mathematical Models (MM) and algorithms, like the *AHMM4LSDES*; 2) Decision trees, like the HDT; 3) Learning fields, like AR; 4) Automated scheduling and planning; 5) ICS/technology, resilience, and processing environments; 6) Robotism, automation, and recognition; 7) Data based decision approach; and other advanced topics. *TRADf* uses a set of AR/HDT actions, which are implemented in a collaborative context. AR tries to understand underlying causes of problems and is an iterative learning and educational process. *Projects* must use an MM like the *AHMM4LSDES* to verify their status and integrity.

The AHMM4LSDES and the LSDES

The AHMM4LSDES includes a dynamic defined nomenclature which can be used to facilitate the integration of any *Entity*. AHMM4LSDES’s nomenclature is presented in Figure 4. AHMM4LSDES’ instances support the DMS4LSDES, by using CSFs weightings and ratings (in phase 1) and is based on multicriteria evaluation. The *Entity’s* EA model and its Architecture Development Method (ADM) are RDP’s kernel elements. The AHMM4LSDES and its underlining set of created instances is based on the HDT (Della Croce, & T'kindt, 2002). In each HDT’s node a precise call to DMS4LSDES functions can be executed. The AHMM4LSDES uses an objective function, for the maximization or minimization activities. for supporting *Projects*.

Basic Mathematical Model's (BMM) Nomenclature		
<i>Iteration</i>	= An integer variable “ <i>i</i> ” that denotes a <i>Project/ADM</i> iteration	
microRequirement	= (maps to) KPI	(B1)
CSF	= Σ KPI	(B2)
Requirement	= (maps to) CSF = \bigcup microRequirement	(B3)
CSA	= Σ CSF	(B4)
microMapping microArtefact/Req	= microArtefact + (maps to) microRequirement	(B5)
microKnowledgeArtefact	= \bigcup knowledgeItem(s)	(B6)
neuron	= action->data + microKnowledgeArtefact	(B7)
microArtefact / neural network	= \bigcup neurons	(B8)
microArtefactScenario	= \bigcup microarteifact	(B9)
AI/Decision Making	= \bigcup microArtefactScenario	(B10)
microEntity	= \bigcup microArtefact	(B11)
Entity or Enterprise	= \bigcup microEntity	(B12)
EntityIntelligence	= \bigcup AI/Decision Making	(B13)
BMM(<i>Iteration</i>) as an instance	= EntityIntelligence(<i>Iteration</i>)	(B14)
The Generic AHMM's Formulation		
AHMM	= \bigcup ADMs + BMMs	(B15)
AHMM's Application and Instantiation for LSDES		
<i>Domain</i>	= LSDES	(B16)
AHMM4(<i>Domain</i>)	= \bigcup ADMs + BMMs(<i>Domain</i>)	(B17)

Figure 4. AHMM4LSDES’s nomenclature (Trad & Kalpić, 2020a).

Supporting Projects

Dynamic *Entity’s* structures, hyper-advances in ESs and related AI, DMS4LSDES, ICS depend on the available resources (like data), to meet challenges. In the last few years, many *Entities*, like the MEHE, have failed to transform and to implement adequate educational innovation policies. Many credible sources have proved that the failure of *Projects* is due to the complexity of encountered problems. The MEHE is recognized and recommended worldwide for its high standards universities and quality; and is committed to the United Nations Charter, to maintain good quality of education (El Khaled, Novas, Antonio Gázquez, García, & Manzano-Agugliaro, 2016). The MEHE like all other ESs depends on the national, historical heritages and the surrounding geopolitical context.

The historical heritage and the geopolitical context

The Heritage

This section presents the CSFs that influence the LSDES, considering Lebanon’s cosmopolitan society that inherited mainly SP’s characteristics. Genetic research conducted in Lebanon proved that the majority of the Lebanese population carry SP genetic identifiers, what is a common national heritage (Caquot, 2017). SP’s affinity for commerce, education and organized massive constructions that started with King

Abiff Hiram (KAH), remain the main characteristics of modern Lebanese, which is a holistic feature that is essential for the *Manager's* profile. Like Rafic Hariri's profile, who succeeded in rebuilding the destroyed Byrut and other parts of the Lebanon in record time. SP represents an authentic Semite culture, affinity, predispositions, and heritage. Unfortunately, Lebanon's ethno-religious instability is due to the region's socio-political situation and Lebanon tries to preserve its complex multicultural democracy (Habib, 2009). Lebanon's main ethno-religious groups are: 1) Levantines, or Latins of the Orient, predominantly a Christian population; 2) Arabs, the remnant of the multiple Arab Muslim conquests; and 3) Other groups. Lebanon was a French-allied dominion that had a strong binding with France, who helped it become a part of the European educational and cultural systems (World Journals, 2002). Lebanon has a rich ethnical mosaic, *LSDES*, tourism based on Arab Gulf countries, and a loose and liberal economic system which is continuously disrupted by GOF activities. In spite of time and consequent MEA's geopolitical dramas, Lebanon still has preserved its Westernized SP heritage and has even been capable of enclosing other cultures to make it a unique cosmopolitan society. Its cultural mixture made the Lebanon a focal point of a networked diaspora that enabled the development of the *LSDES*. Its educational and financial predispositions attracted many global *Entities* (Fregonese, 2009; Zalloua, 2004). Aggregate Lebanese communities create a virtual/confederal environment related to global communities. *LSDES'* main advantage, is that Lebanese students are thirsty for knowledge and sciences, knowing that Lebanon had ancient academic institutions like Byruti's law school, that had the following characteristics: 1) It was a centre for the study of Roman law in classical antiquity; 2) Its professors made major contributions to the Codex of Justinian and it achieved wide recognition and was known as the *Mother of Laws*; and 3) It was one of the few schools allowed to teach jurisprudence... Lebanon's most significant heritage is the Lebanese language which is an Aramaic dialect and more specifically *Syriac*.

The Lebanese language is a distinctive and a unique language that can be considered as the root of Lebanism (LLI, 2010). The Lebanese language and the Arabic language share common roots and are offshoots of the original Semite languages and is spoken by millions of Lebanese in Lebanon and the world (about 20 million people). Phoeniciology is a sub-discipline of Archaeology exclusively studying of ancient Phoenicia, occupying modern-day Lebanon and Tunisia, and to a lesser extent, Cyprus, Malta, Sicily, Sardinia, Corsica, Israel/Palestine, and Spain. It is difficult to practice Phoeniciology, because of the scarcity of sites and the major destructive campaigns against the SPs. Carthage and Tyre have been destroyed by powers like Rome and Greece; and actually by Iran. Although they faced major challenges SPs and other Semite tribes, succeeded due to their capabilities to colonize the MEA and the MC (Trad, 2021d).

MC's Colonisation and SPs' Capacities

Many concrete evidences confirm that SPs crossed the Atlantic Ocean to access other continents, where they sailed using techniques like: Stars' orientation, Sea flows, and Winds' courses. These techniques supported large and precise distances navigation. Brazil has many SP sites, and many proves indicate that they settled in its north-eastern region. In Longá region, there is a lake where SPs harbour with a *Carpássios* (old ships) platform. The predominant Maya, Toltec and Aztec civilizations share a common SP ancestor (Karam, 2020). This proves SPs' seafaring and massive constructions' capabilities and other known cases like, KAH who was present when Cyrus has blessed Tyrus and saved the Sidonians; and his most important deed was the alliance with King Salomon, that is considered as the first civilized alliance. This alliance put basis for massive constructions and commerce. King Solomon and his father, David, were greatly indebted to KAH, for his support in the construction of the Hebrew Temple of Jerusalem. The inhabitants of Tyrus, were known for their exceptional skills as artificers, merchants, and seafarers. Tyrus had a full body of architects known as the *Fraternity of Dionysian architects* (Trad, 2021d). These facts have brought the Lebanese many challenges.

Major Challenges

Armenians, Lebanese Christians, Aramaic speaking Assyrians of Iraq, south-eastern have been decimated in the 1915 Great Genocide that was committed by the Ottomans and their German ally. These

persecutions decimated Christian minorities in the MEA, where in Lebanon 70% of its Christians vanished. SPs heritage or Phoenicianism, provoked destructive conflicts, like the 1958 and 1975's externally organized civil wars, between pro and anti-Semite parties. These conflicts are irrelevant, because scientifically all Lebanese have SP origins. Another major challenge is the rise of terrorism which draws roots from the Assassins Order founded by *Nizari Isma'ili* sect of Shia Islam; they launched terrorist actions on Moslem and Christian personalities alike (Elayi, 2013). Modern terrorism proves the cyclic nature of MEA's conflicts; where Pan-Arabism joins Germanic National Socialism, in the logic of Anti-Semitism. Notorious Nazi criminals were engaged by Pan-Arabists, to organize and decimate Semite minorities. Like the case of the Austrian Nazi, Alois Brunner, the right hand of Adolf Eichmann, who was working for the Syrian genocidal dictator Assad. Brunner and his Assad's assistants tortured and assassinated, with utter brutality, many Lebanese and destroyed cities like Damour, Zahlé, Tripoli, Beirut, Qaa, Until today tens of thousands are still missing (Wikipedia, 2020a; Trad, 2021d). These major challenges created a complex cohabitation.

A Complex Cohabitation

The complex cohabitation resulted in a complex democracy, which is very hard to follow, but it corresponds to the Lebanese reality (Habib, 2009). ... And, due that Lebanon has 22 authentic ethno-religious minorities. Despite this complex cohabitation, the tolerant Lebanese want to live together. This fact contradicts the reasons for the 15 years an imposed civil war, which is known as the *War of Others* on Lebanon. Antoine Francis' proved that an external actor caused the civil-war in Lebanon (Francis, 2002). Before the civil-war, the Lebanese currency became a solid currency, and Lebanon's standard of life became respected worldwide. Its predispositions and its *dolce vita* attracted many institutions, and *Entities* to install their activities in Lebanon (Fregonese, 2009). But this fulgurant evolution did not last, because a GOLF wanted it to be disrupted. A GOLF well-known case was Beidase's Intra Bank, was a mighty worldwide bank that made the Lebanon an elite hub. These facts supported LSDDES' evolution which was influenced by the facts: 1) The Aramaic language and the Lebanese dialect; 2) The Islamo-Arab cultural/language where Lebanon is a leader in Arabic literature and culture (Hitti, 2002); 3) Other minorities like Lebanese Israelites who still are attached to Lebanon and are an important part of its cosmopolitan society (Forbes, 2016); and 4) Other cultural influences. All these problems were faced by Lebanon, who was supported by its historical and loyal ally France.

France the Ally

The Lebanon and Europe, and more specifically, France, have a long historical relationship. Many Frenchmen settled in Lebanon and many Lebanese, predominantly settled in France to create a cohesive Franco-Lebanese community, which includes prominent personalities, like, Charles Malik, Petro Trad, Charles Helou, Michel Chiha, Camille Chamoun... The legendary French president, Charles De Gaulle, who lived in Lebanon, contributed to a strong vision of the Franco-Lebanese community (Bitar, & de Fouchécour, 2015). Lebanon's eternal ally, France, has always played a decisive role in the survival of Lebanon and its culture and ES (AFP, 2022). which includes Lebanese who have never been in France, but have fully embraced the French culture, language and its secular republican values; and have even adopted the flag shown in Figure 10, which is the official French flag with an incrustated Lebanese cedar. The Lebanon and its MEHE have an advanced equality concept.

Equality Concept

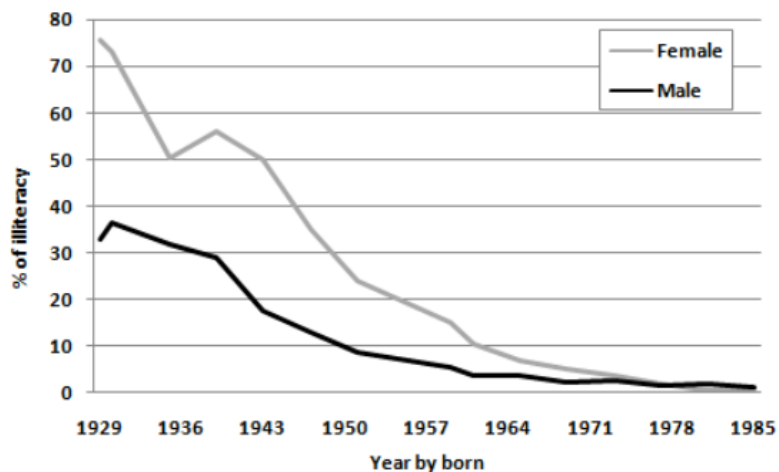


Figure 5. Percentage of illiteracy by gender and age.

Figure 2 shows that the level of illiteracy among the adults and it shows the following facts: 1) Illiteracy levels are increasing proportionally with age which is positive; and 2) The gap is practically null at the age of 15, this negligible gap shows the authentic Lebanese awareness of equality (El Khaled, Novas, Antonio ut Gázquez, García, & Manzano-Agugliaro, 2016). Lebanon's equality concept can be envied even by north European countries because education is one of its main stubs; unfortunately its unstable geopolitical context makes its advantages hard to preserve.

Geopolitical Context

The *LSDES* is dependent on Lebanon's geopolitical construct (that has western and oriental views) and also on MEA's instability. Lebanon has in some periods, optimal geopolitical context that backs the *LSDES*, like the following facts and events: 1) The Sykes Picot agreement which defined the spheres of MEA's influence and control of the MEA. In which allied France gained control of Lebanon; 2) The strong Western influences (French, European and USA's) on Lebanon's society, culture, and *LSDES*; 3) Local views on geopolitics supported by: Camille Chamoun, a Western supported president of Lebanon who developed a pro-Western geopolitical concept of Lebanon, Charles Malik who considered Mount-Lebanon as a strategical fortress, Philip Hitti who saw Lebanon as the centre of Arab history and literature; 4) In 1947, a United Nation (UN) group including *Charles Malik* developed the *International Bill of Human Rights* (United Nations, 1947); 5) The role of demography and the decline of minorities due to external destabilizations (directed by Syria and their Russian allies); and 6) Even if the complex geopolitical context Byrut is striving for keep its cosmopolitan structure and to remerge as global and regional *LSDES* hub.

BYRUT AS AN LSDES HUB

Lebanon must enforce: Confederal system, neutrality, secularity, and distance itself from MEA's conflicts. Byrut has always faced many challenges and risks of destruction and actually it is facing historical difficulties. Byrut's influence on the *LSDES*, can be supported the following sets of CSFs: 1) Evolution of the levels of education and standards of life; 2) Cosmopolitanism, diversity, and Byrut's demography; 3) Geopolitical and regional events' influence; 4) GOFP's dangers and prejudice, which in the last few years emptied Lebanon's bank and transferred this richness to Switzerland, leaving its population at the level of deep poverty; 5) To become and open and peaceful city; and 6) To interact with global ESs. The *LSDES* was influenced by the eminent Byruti elite community, which was made from nine families: the Sursuqs, Trads, Bustruses, Tuenis, Khuris, Debbases, Tabets, Naggiars, and Farahs; which were labelled as the nine families. Byrut and other CSs were at the origin and epicentre of democracy.

The Epicenter of Democracy and Neutrality

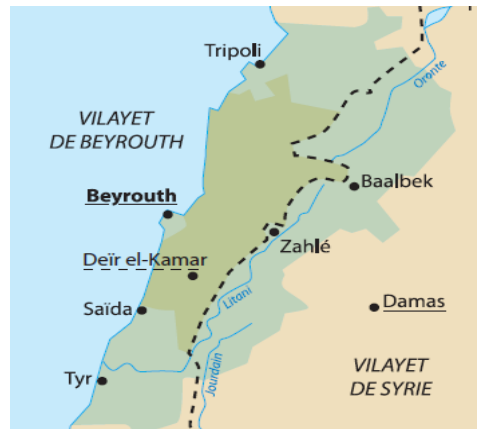


Figure 6. Lebanon's historical region.

Democracy is considered to have come into life in Athens at the end of the sixth century BCE. Simon Hornblower's notes that: *'The Phoenicians... had something comparable to the self-regulating City States or polis [and there is] the possibility of SP origins for some of the Greek political arrangements we most admire. Scientific study in this area has, however, hardly begun'*. Where some other research in this area have been conclusive and considered that SPs were the first to apply democracy and SP City States (CS) had democratic government structure long before Athens (Robinson, 1997; Stockwell, 2020a). This unique heritage of freedom, independence, and democracy is still felt in Byrut and other SP CSs. A highly confederal and democratic SP characteristics enabled a neutral geopolitical attitude, which Lebanon is hardly trying to defend; but unfortunately, external extremist regional powers are trying to change these historical facts. A historical confederal mentality is mainly SP regions were managed as confederal CSs.

SP Main CSs

SP CSs are: 1) Tyre, which was for centuries the leading CS; 2) Sidon is the 3rd largest CS in modern Lebanon; 3) Enfeh is located in North Lebanon; 3) Amia is located on the top of a hill drawing back to the 2nd millennium BCE; 4) Arqa is a village northeast of Tripoli and has archaeological evidence drawing back to the Neolithic period; 5) Baalbek is a UNESCO World Heritage Site due to the important of ancient Roman ruins; 6) Botrys is one of the oldest cities worldwide; 7) Byblos is the oldest civilized city that has been continuously inhabited since 9,000 BCE; 8) Sarepta lies between Sidon and Tyre in the south of Lebanon; 9) Tripoli is the second largest city in Lebanon; 10) Byrut is the capital and the largest Lebanese city; it was inhabited more than 10,000 years ago, and its name originates from the SP: *be'erot* (wells), underground water sources which are still used today.

Byrut CS a Capital

Byrut is a cosmopolitan CS with a unique, ethnically diverse liberal system initially designed by Michel Sursock and etro Trad (Tarazi-Fawaz, 2014; Toufic, 2004). Its fragilized cultural, ideological, and cosmopolitan mixture made it a focal point of a networked diaspora and enabled the development of global powerful services backed by a leading LSDES and the Byruti financial hub. Byrut is a mixture of many minorities and cultures and until the year 1975 it had an outstanding economy and formed a cosmopolitan Byrut's *Style de Vie*, which popularized its LSDES. Its exposed LSDES, cultural and ethnical mixture made Byrut a very attractive city and a leading educational centre. Byrut's various predisposition attracted many businesses, universities, institutions, and personalities to create and promote their activities in it (Trad, 2019a; Fregonese, 2009). The evolution and transformation of Byrut is an extremely a complex process and there is a need for an evolutionary process to become a leading educational hub which is a long-term process that includes the improvement of security and infrastructure; and above all to make it a disarmed, secular, and open/neutral city. The *Project* must deliver a conflict prone strategy to

support the *LSDES* (Trad, 2019a). The *LSDES*, Byrut's economy, evolution, and finance depend on the following facts: 1) Existing recognized *Entities*; 2) Globalized banks and financial institutions; 3) Local resources and capabilities; 4) Historical Byrut's sites; and 5) *GOPF's* destructive tactics. But unfortunately, there are many fatal dangers like the latest major terrorist act that destroyed Byrut's port.

The Port of Byrut-The Blast

The port of Byrut is an archaeological site that is located between Rue Allenby and Rue Foch in Byrut. Studies have proved that the Bronze Age waterfront was laid behind today's port due to coastal regularization. It was excavated and reported on by Josette Elayi and Hala Sayegh in the year 2000 and determined to date to the Iron Age III and Persian periods. Byrut has seen fulgurant evolution and many catastrophes, like the August 4th, 2020, Directed Terrorist Act (DTA) that shook it, killing many people and destroying the Christian sector of Achrafieh. The destroyed area is around SP's historical port and the blast caused major damage throughout the city. The French President Emmanuel Macron was the first foreign world leader to urgently visit Lebanon after the DTA, which shows the special Franco-Lebanese relationship. Macron stated: *I express my fraternal solidarity with the Lebanese people after the explosion that led to so many victims and to so much damage tonight in Beirut... France stands by Lebanon's side. Always. French aid and resources are on their way to Lebanon...* He also the historical term: *Lebanon is France and France is Lebanon*. A two-week state of emergency was declared and DTA's cause is linked to stocks of ammonium nitrate in a warehouse used by illegal terrorist pro-Syrian and Iranian militias. The DTA destroyed what was left of the Lebanese commerce, exchange and cultural life.

Commerce, Exchange and Cultural

SPs main activities were and still are, educational, commercial, and cultural exchanges with various regions of the world. These exchanges helped them accumulate skills, knowledge, wealth and made them develop the *LSDES*. SPs established colonies which insured valuable exchanges and the latest excavations of SP sites, have recovered materials that identify connections between remote SP colonies and Lebanon as shown in Figure 7. SP's sea connections used maritime exchange model called the Lebanese Trade Network (LTN) which involved both direct and indirect exchange of products, know-how and cultural exchanges. The LTN, was a sophisticated system of culture, interconnections, moderately independent colonies which participated in the advancement of SP's mercantilism and economical evolution. A general overview is needed to understand the LTN that needs to present the relationships between SP colonies, the diversity and complexity in the LTN's structure. The LTN is critical for understanding the nature of SP's interactions and potential educational and economic relations. The sophisticated and complex LTN made CSs interrelated culturally, economically, and politically; that helped the evolution of a specific banking system (Puckett, 2012).



Figure 7. Trade routes of the ancient LTN (ACW, 2018).

Banks and the Legal System

The Lebanese banking and financial environments attracted regional and international institutions to get closer to the immense Arab oil-based wealth, the petrodollar dividends of which were pouring into Lebanese banks, making Lebanon a major financial actor. Lebanon's hybrid financial environment includes Islamic finance, that faces the following challenges (Albawaba Business, 2014): 1) Many years after the introduction of Islamic banks in Lebanon and despite efforts by the Lebanese Central Bank to regulate Islamic finance, Sharia-compliant lenders have to adapt to the Lebanese complex banking sector; 2) Bankers and financial analysts interviewed by *The Daily Star* gave, concerning Islamic finance, said that they believed that it failed to make a mark in the Lebanese banking sector, and Ghassan Chammas, adviser to the board of directors of BLOM Development Bank, describes it as a black box... 3) Rima Turk Ariss, a finance professor at the Lebanese American University (LAU), argues that Islamic banking in Lebanon focuses on debt-based contracts, known as Murabaha and not on equity-based contracts; and these two approaches are hard to integrate; 4) Raed Charafeddine, the Central Bank's first vice governor, argues that Sharia-compliant banking's unpopularity in Lebanon, is because clients are not drawn to non-guaranteed deposits; and 5) The Lebanese Legal System (LLS) has implemented a pluralistic approach for banking that provides for both Islamic and conventional banks' well-defined integration processes, these efforts aim to strengthen the public's trust vis-à-vis Islamic banks. The complex Lebanese society is the enabler of the LSDES.

Researched LSDES areas

The Foundation

The LSDES draws its roots from Christian missionaries during the Ottoman occupation of Lebanon; where they founded two prestigious universities: Université Saint-Joseph (USJ), and the American University of Beirut (AUB). During the France's presence, the French ES was adopted to improve the LSDES; and Baccalaureate was introduced and administered at the end of the secondary education phase. French is practically an official language and is used many courses in secondary education. Arabic, French, and English languages are commonly used in Lebanon and its LSDES.

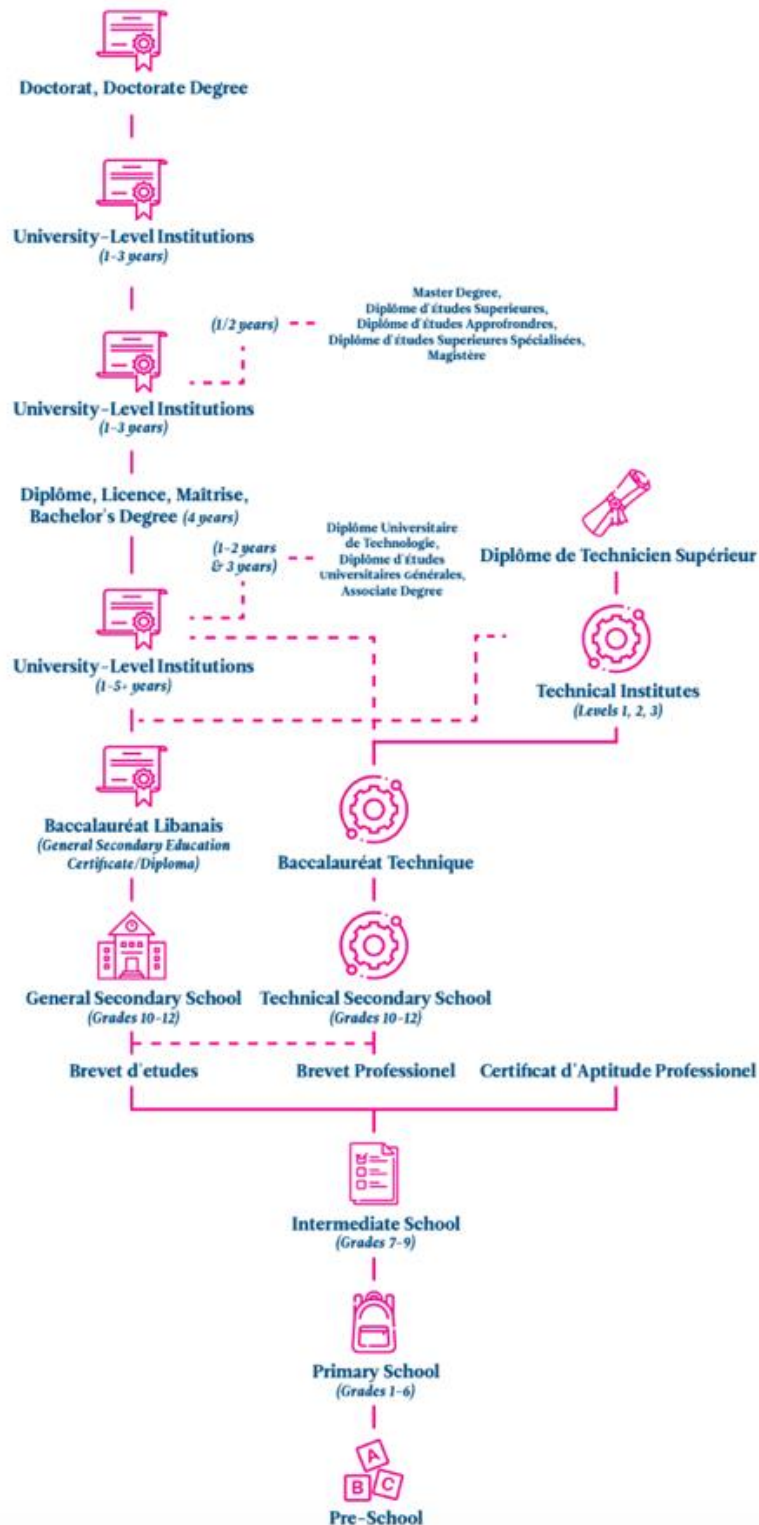


Figure 8. Lebanese Educational System (Holistic Think Tank, 2022).

At the independence in 1943, Lebanon reintroduced Arabic as an official language, and at the end of the civil war, the *Taef Agreement* tried to leverage the LSDES as a medium for Lebanon’s identity and social cohesion. Based on the *Article 26 of the Universal Declaration of Human Rights enshrines the right to*

universal free primary education, the Lebanese constitution gives the right to an education. As shown in Figure 8, the LSDES is centred around the MEHE, which manage public sector institutions through regional bureaus within each province. The Centre for Educational Research and Development (CERD) was launched under the responsibility of the MEHE. Its task is to draft high-quality curricula, make revisions, and prepare teaching methodologies (Holistic Think Tank, 2022).

MEHE a High-Quality System

In the 19th century, in Lebanese cultural institutions, local and foreign intellectuals agreed to revive old SP traditions and to embrace and integrate modern cultures. At that moment seven main universities and schools were founded. Like the AUB, which was founded in 1866, and is today educating region's managers, leaders, and intellectuals. The LSDES provides a range of schools', where students can choose the language and educational orientation. Higher education in Lebanon is administered by the Ministry of Culture and Higher Education, which manages 41 private universities and a public one. Even though the official language of Lebanon is Arabic, the languages of instruction at ²university levels is English or French, which shows its western cultural preferences. Twelve Lebanese universities feature in the *QS University Rankings: Arab Region 2021*. Eight of these leading Lebanese universities are also featured in the *QS World University Rankings 2021*. The Lebanese top universities year are (Topuniversities, 2022): 1) AUB, ranked 2nd in the Arab region and joint 220th in the world; 2) LAU, ranked 551-560 in the world and 19th in the Arab region; and 3) USJ, is ranked 19th in the Arab region and 541-550 in the world. The LSDES has profited from various cultural and religious communities that established religious private schools, and almost all private schools dependent on western staff, who propagated also ethical principles.

Ethical Principles and The Mentality of Predators

Ethical principles should stop racism and anti-Semitism, where intentional apartheid discrimination towards foreigners and colored people, like in Switzerland, in which its ruling party, the Schweizer Volks Partie (SVP), a neo-Nazi like construct that uses 1933-like attitude; where even Europeans are considered as an inferior race (Maurisse, 2016; Miller, 2017; Le News, 2015, 2017).



Figure 9. The apartheid Swiss ruling party's poster (The Local, 2017).

Snowden declared: ...Switzerland is the most racist state in the world (Snowden, 2015), Racism based on the color of skin as shown in Figure 9; 6) SFFT related politicians, where convicted for major racist hate crimes; and Christian Levrat, compares the ruling SVP to Nazi regimes (Tribune de Geneve, 2014); where the main aim is to plunder foreigners; 7) The latest major financial crisis' main and only winner is SFFT,

who looted the invested capitals, that is based on the motto: ... when an Entity goes bad, collect its fortune from its fleeing and desperate immigrating population, like in WWII (Rickman, 1999;BBC, 2016), and they even stripped the belongings of the latest immigration waves, where the Swiss police actively took a part.



Figure 10. The apartheid Swiss ruling party's poster (The Local, 2017).

Besides racism their other forms of unethical behaviors like financial crimes. The Nobel prize winner, the British economist, Angus Deaton, warns about unethical predator's professionals graduating from business schools, which are behind major financial crimes and hence human tragedies. Leading schools with such a unethical perceptions are the Chicago school, and the Swiss HEC, and many others (Le Monde, 2019). Predator profiles can be classified as dangerous profiles who are the biggest threats to any Entity. Predators' only motivation is extreme cupidity which is destroying Europe's human, industrial, societal, and engineering capacities. Revelations of the Swiss Leaks affair, the Swiss HSBC condemned for tax avoidance shows the need for an evolution towards ethical banking and that future generations of students in finance, economics, and management, must be aware of ethical principles. An example of such ethical principles are (Murray, 1996): 1) Content competence, where a Professor maintains a high level of matter knowledge and ensures that his course's content(s) are feasible, ethical and appropriate; 2) Pedagogical competence of a Professor who communicates the main course's objectives; 3) Dealing with sensitive topics should be presented in an open honest and didactical manner; 4) In the student's development process the Professor should avoid actions like discrimination; 5) To, avoid dual relationships with students; 6) Confidentiality on student's information like are managed with confidentiality. The LSDES must consider the roles of corruption and organized financial crimes which have damaged severely Lebanon, by transferring all its richness to Switzerland (Stupples, Sazonov, & Woolley, 2019). And because of such misdeeds Lebanon is on the brink of starvation and its LSDES is facing collapse...



Figure 11. Fleeing Migrants.

Lebanon is destroyed and its human capital is humiliated and are fleeing as refugees as shown in Figure 11; where there are major dramas like a family with four kids drowned after that their belongings and banks accounts have been hijacked by Swiss bankers. LSDES, like all students around the world, are attracted to certifications, which makes it more difficult for *Entities*, especially in ICS disciplines.

Education and Instructional Certifications

The main differences between these two disciplines are (Rob, & Roy, 2013): 1) Certifications attract hiring managers who suggest that certifications can replace traditional education; 2) Certifications have been integrated in some *Entity's* programs and there were difficulties because certifications are based on commercial tools; which is a very commercial and fast-education approach. And is not appropriate for ICS fields; 3) The unstable, siloed approach, frequent changing nature of certifications... 4) Certification programs can improve traditional lecturing and converge with standards, but can never replace ICS education which has a broader approach; 5) Nevertheless, students are attracted by certifications; 6) This can on the long-term, lock-in *Entities*, as AI and ICS tools come from a single mainstream; and 7) Certifications are superficial and can just assist a specialist and very experienced engineers, but an *Entity's* academic diploma stays essential, especially for profiles like the *Manager*. This dilemma can be simply solved by the following question: *Would anybody except to be operated by just a person having a commercial certification and does not have a real university surgeon diploma in medicine...?* The answer would be surely *No*. For the LSDED, the author recommends focussing on qualitative higher education, rather than quantitative certifications; and that reduces the risk of locked-in situations.

Locked-in Situations and Vision

The LSDES must define rules and a vision in order to avoid locked-in situations, like in the following cases and situations: 1) Locked-in is defined as, *a situation where an Entity is unable to exit a position because of the regulations, or penalties associated with doing so* (Investopedia, 2017); 2) A strategy should recommend avoiding Locked-in situations, like GOFP or FinTech locked-in; and 3) A LSDES concept should avoid to adopt a unique tool (and ICS environment); and 4) An *Entity* should develop its own academic strategy and a continuous need to query the national context.

The National Context

The Lebanese constitution permits communities to implement *Entities* and to diversify the LSDES. Foreign influences gave the LSDES its multicultural/multinational character reflecting Lebanese educational and cultural flexibility. Lebanese diversity shaped the LSDES, which also reflects deep sectarian divisions. *An ES is designated as weak, if it reinforces social fissures that can represent dangerous sources of conflict...* In Lebanon, since the 1920's the demand for learning was growing and the number of public *Entities* has strongly risen (El Khaled, Novas, Antonio Gázquez, García, & Manzano-Agugliaro, 2016).

Institute name	Acronym	Date founded
Phoenicia University	PU	2015
Matn University College of Technology	MUC	2014
Lebanese University	UL	1951
American University of Beirut	AUB	1866
Université La Sagesse	ULS	1875
Université Saint-Joseph	USJ	1875
Lebanese American University	LAU	1924
Académie Libanaise des Beaux-Arts ¹	ALBA ¹	1937
Middle East University	MEU	1939
Université Saint-Esprit de Kaslik	USEK	1950
Haigazian University	HU	1955
Beirut Arab University	BAU	1960
Conservatoire National des arts et métiers	Cnam	1971 (1794 in Paris)

Beirut Islamic University	BIU	1982
Makassed University of Beirut	MU	1986
University Of Tripoli	UT	1986
Notre Dame University - Louaize	NDU	1987
Jinan University (Lebanon)	JU	1988
University of Balamand	UoB	1988
City University Formerly (Manar University of Tripoli - MUT)	CityU	1990
Global University	GU	1992
American University of Science and Technology	AUST	1994
Lebanese National Higher Conservatory of Music	LNHCM	1995
Antonine University	UA	1996
Islamic University of Lebanon	IUL	1996
American University of Technology	AUT	1998
Arts, Sciences and Technology University in Lebanon	AUL	1998
Al-Kafaàt University	AKU	1999
Rafik Hariri University	RHU	1999
American University of Culture & Education	AUCE	2000
Lebanese French University of Technology and Applied Sciences	ULF	2000
Modern University for Business and Science	MUBS	2000
Université Sainte Famille	USF	2000 ^[2]
Lebanese International University	LIU	2001
Arab Open University	AOU	2002
Lebanese Canadian University	LCU	2003
Lebanese German University	LGU	2008
University of Sciences & Arts in Lebanon	USAL	2012
Al Maaref University	MU	2015
Azm University	AU	2015

Figure 12. The list of *Entities* or universities in Lebanon (Wikipedia, 2021).

LSDES' main characteristics are: 1) A multicultural construct which supports diversity; 2) Highly qualified academics; 3) A high level of literacy and social standards; 4) Represents all religious, political and ethnical groups; 5) Gives roles to foreign partners; 6) Instability and political violence; 7) Exceptional predispositions; 8) The role of geopolitical factors; 9) The role of finance; 10) Tourism and services; 11) Virtual education and é-learning capacities; and 12) The infrastructure. As shown in Table 9, the LSDES contains one public university, and the rest are 31 privates. Contrary to conventional social inequality in Lebanon, female percentages are extraordinary in all educational levels and can be envied by many north European nations; equality is mainly based on education and not only material features (El Khaled, Novas, Antonio Gázquez, García, & Manzano-Agugliaro, 2016). The public *Entity* or the *Université Libanaise (UL)*, was founded in 1967 and has various branches in Lebanon; and uses Arabic, French and English.

The Lebanese University

The UL was first mentioned in the speech of the former Minister of Foreign Affairs, Hamid Frangieh in the ceremony at UNESCO, held in Beirut in 1948. In the year 1951 the UL was created. It has been headed by well-known personalities like: Dr. Edmond Naim, Dr. Boutros Dib... The most recognized faculties and branches are Faculty of Sciences, Faculty of Pedagogy, Faculty of Engineering... The UL is affiliated with the Institute of Applied Sciences and Economics (CNAM-ISA), which operates in France (UL, 2018). Until the year 1975, UL's institutes were in the Philistine stronghold or what was known as west-Beirut, which was dangerous for the Christian population and other minorities. Then a parallel UL (or UL II) was created in east-Beirut by Dr. Elie Trad and Said El-Boustany, who were supported by the Lebanese Front. In a short period the UL II became a well-known and credible *Entity*. Today the UL has many sections in the governorates of Mount Lebanon, North Lebanon, South Lebanon and Bekaa. The UL is a central *Entity* in Lebanon always having a high number of students, in some years passing 80,000

students, which makes it the largest and most important University in the MEA. As Lebanon's SP heritage suggests a confederal mentality and therefore its *Entities* like the UL has to be decentralized, where each CS manages its own branch, which can imply that some decentralized governates like *Mont-Liban* can become much closer to the French and European models; while others can link to Syria, Russia, and Iran.

The French and European Model

Lebanon's Catholics (Maronites and Jesuits), were the first to establish religious schools, and afterwards it was followed by Presbyterian missionaries, Greek Orthodox and Armenians... To produce a large network of French *Entities*; and the most known is USJ, established in 1877. The most known French schools are: 1) Mont La Salle; 2) Lycée Charlemagne; 3) Lycée de Ville; 4) Collège Protestant Français ; 5) Antonine International School; 6) Collège Louise Wegmann ; 7) Collège Melkart; 8) Lycée Français; and others. The most prestigious French universities are: 1) Notre Dame University (NDU), is a non-sectarian Catholic University, which offers many undergraduate & graduate degrees; 2) La Sagesse University, is a nonsectarian Catholic University and belongs to the archdiocese of Beirut; 3) University of Balamand, is a non-Sectarian Greek Orthodox university; 4) Université Saint Esprit Kaslik, is a non-sectarian Catholic University; and 5) USJ, which Offers diplomas in a very wide range of areas. There are also many European schools and the most important one is the German International School Beirut. Another very popular model is the Anglo-Saxon model.

The Anglo-Saxon Model

The most known schools are: European Lebanese, Lebanese American, Lebanon Evangelical, ALLC International House, Brummana High, and Eastwood College. The most prestigious *Entities* are: 1) AUB which operates under a charter from the State of New York, and it offers programs leading to both the Bachelors and Masters degrees; 2) Haigazian University, was founded in 1955 by the Union of Armenian Evangelical Churches; and 3) LAU, formerly the Beirut University College (BUC). The westerns models are challenged by the Arab model.

The Arab Model

This model is marginal and has mainly the Makassid network of schools, established by Islamic nations and the Beirut Arab University, which offers a large set of programs. All these models can deliver profiles which can cope with complex projects.

Profiles for Complex Projects

Complex projects need a specific *Manager's* profile, and the LSDES offers such possibilities; like in the case of late Rafic Hariri who was responsible for the implementation of a very complex renovation project which was the reconstruction of Byrut city. Hariri was the Prime Minister of Lebanon he was credited for his role in ending the by civil-war and played a huge role in reconstructing Byrut. Unfortunately, he was assassinated by the Iranian Hezbollah members... And what would be the role of ICS in such *Entities*.

The role of ICS in entities

The Role of Finance and Technology

ICS has transformed Financial and Technology (FinTech) and improved educational capabilities. The LSDES must be transform its curriculum to include (Buttice, 2020): 1) *Fraud Detection and Compliance*; 2) *Improving Customer Support*; 3) *Preventing Account Takeovers*; 4) *Next-gen Due Diligence Process*; 5) *Fighting Against Money Laundering*; 5) *AI Data-Driven Client Acquisition*; 6) *Computer Vision and Bank Surveillance*; 7) *Easing the Account Reconciliation Process*; 7) *Automated Bookkeeping Systems*; 8) *Algorithmic Trading*; 9) *Predictive Analytics and the Future of Forecasting*; and 10) *Using EA, online services....* The facts related to FinTech's ICS skills, are: 1) *Radical Transformation Process*; 2) Logging media; 3) Automated financial processes; 4) Automated transactions; 5) Cybersecurity; 6) Digital banking; and 7) To use ICS in a cross-functional EA.

LSDES Main ICS Profile-A Manager as a Cross-Functional EA

Manager's curriculum can include following subjects (Trad, & Kalpić, 2014a, 2014b): 1) Knowledge in national-International law and governance; 2) EA and business architecture; 3) Enterprise holistic skills; 4) Business modelling skills; 5) Business integration; Strategic planning; and services modeling, etc... 6) AI and data models; 6) Automated process environments; 7) Agile Project Management (APM); 8) ICS implementation know-how; and 9) Virtual Group Work (VGW).

The VGW

The VGW supports students' group work in the context of a project and is based on existing standards, methodologies, local specificities, and traditional educational practices. Complex educational topics need VGW to integrate agile collaboration, educational patterns, best practices, and educational services' management. Agile coordination generates various types of problems, that are difficult to solve and which can disturb the LSDES processes. VGW's limitations are the *Entities'* capacities to restructure their environments; and integrate avant-garde technologies in all their departments; that needs a specific type of staff (Trad, 2022a). This paper is supported by a set of Applied Case Studies (ACS) for the PoC.

The ACSs and the PoC

The PoC has ACSs, which are combined to cover aspects, where central one is the ICS, which is presented in the Open Group's case. The used ACSs are suitable because they integrate cross-functional domains and where CSFs are measurable by the HDT. In each ADM iteration, the *Project* is evaluated. These ACSs are (Trad, 2022a): 1) The case of educational institutions in Australia which wanted *flexible delivery* as a panacea for encountered problems; because the response to massive education needs the integration of diverse student groups (Postle, 2003); 2) Complex ICS environments pose challenges for *Entities*, which have to be capable of delivering VGW based courses (Sagheb-Tehrani, 2009). The ACSs are associated with the RDP and PoC.

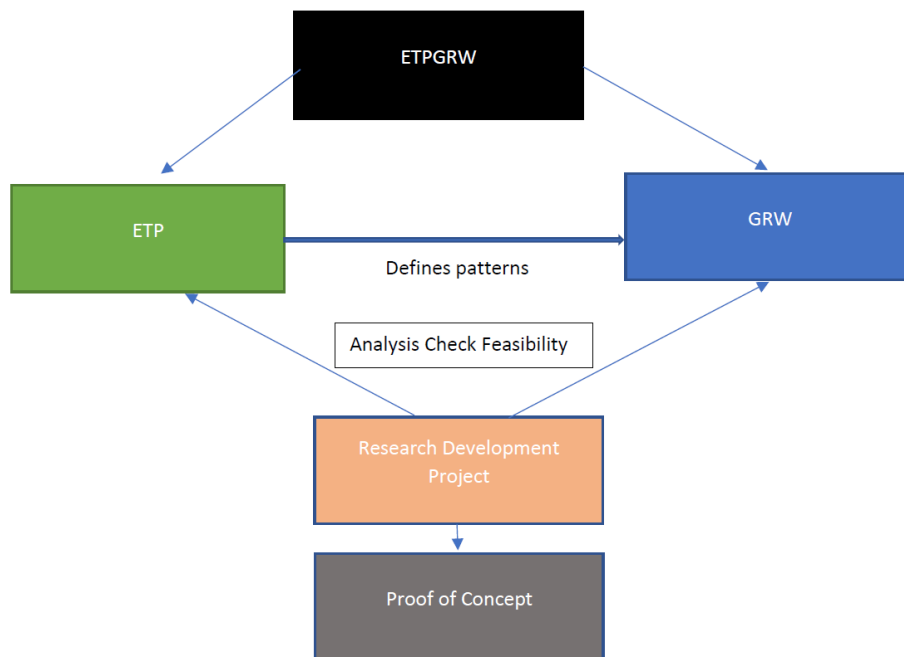


Figure 13. The relation between the LSDESVGW and the RDP.

The LSDESVGW supports the *Project*, the use of avant-garde technologies, and to interface standards, like TOGAF, Schools Interoperability Framework (SIF)... (Service Architecture, 2022). This paper shows that the LSDESVGW needs holistic cross-functional capabilities and as shown in Figure 13, the LSDESVGW can be used by the RDP that is based on the ADM (The Open Group, 2011a). The LSDESVGW needs to be assisted by the DMS4DSLES and KMSVGW to solve various types of problems.

TRADf's interactions include the following components: 1) ICS components integration; 2) DMS4DSLES; 3) KMSVGW; 4) LSDESVGW; 5) RDP; and 5) Offers VGW Educational Patterns (VEP) based ES or cloud.

The VEP based Educational System/Cloud

In order that the *Entity* stays competitive, it must coordinate security, data, business, and integration activities (Tiwari, 2017). Major technical ICS problems like security, availability, unreliable access, and the lack of support, can damage the LSDES and that prevents *Entities* to deliver. The Cloud offers advantages in these domains (Pappas, 2022; Trad, 2022a). VEPs can be applied in the Cloud, like the, like the student's collaboration pattern. In domains related to education in ICS topics, Professors need to integrate challenge based and VGW collaboration projects to enhance learning processes. The successful use of VEPs to improve students' ability to work in virtual teams. In challenge-based learning, Professors participate as project managers, where they provide support for the project's progress. Professors must continuously improve teaching concepts as tasks progress. Challenge-based education, students work on a concrete case study, in which they trace their project tasks (Pisonia, Gijlersc, Nguyend, & Chene, 2021). The complex activity of interconnecting the *Entity's* educational processing nodes, is extremely complex, and in general it causes major resistance from the staff and students. But to avoid such scenario(s) the use of VEPs can bring enhancements. The *Entity* has to implement a platform to support video interactive collaborations. For that there is a need to identify the needed Online Collaboration Patterns (OCPs) to be in video-based practices. OCPs support interaction using collaboration technologies (Pea, & Lindgren, 2008). VEPs can support and enhance the VGW.

VEP based VGW

VGW skills are essential for ICS engineers and should be included in the *Entity's* curricula, to support students in acquiring virtual team techniques and skills. During VGW activities, problems happen, due to a set of conditions, like unstable group constellations or lack of instructor's guidance. Students have to find strategies for solving these VGW problems. VEPs offer a way of supporting students by providing problem-solving strategies, which in general have to be tested. VEP can be applied in an interdisciplinary ICS engineering project. VGW forms the main part in ICS engineering education.; the ACM/IEEE CS Curriculum Guide 2013, explicitly includes VGW/teamwork, communication, time management, and problem-solving skills as part of the *software engineering and social issues* and *professional practice knowledge*. These skills are often included in curricula of students' VGW projects, ranging from small to larger ones. Reports on what makes projects manageable and successful include CSFs like, essential Professor's guidance. But important Professor guidance needs time and can lead to that the Professor solves their problems. Where Professors' role is to support students to be able to acquire skills autonomously. That is achieved using VEPs for communicating known collaboration scenarios, to impact positively on the acceptance of VGW. This paper's section refers to an external student's project, which was an interdisciplinary ICS/software engineering project at Radboud University Nijmegen, which included third year undergraduate students of the ICS and AI curricula. There were nine groups of six students each, a total of 54 students, where each group had different ICS and AI project. These projects architecture and the requirements tasks were developed by other student groups from other courses. The resulting ICS and AI solutions were delivered to external real-life Clients. VGW collaboration, like participating in VGW activities and achieving project's results in a collective manner, was a strategic educational goal. At the project's initiation the used collaboration VEPs were presented to the students and templates were provided to apply these VEPs. The students were continuously informed virtual collaboration was a strategic educational goal and that it's an important element of their final written exam. When necessary, the Professor referred to the collaboration VEPs and how can they be applied; that was done using specific didactics. This section is considered an ACS and used in the PoC (Koppe, van Eekeleny, & Hoppenbrouwersz, 2015). The VEPs supports ICS creative design activities.

ICS Architecture, Design, Development Activities and Creativity

ICS architecture, design, development activities (simply *Dev*) and creativity is an important CSF in education and a crucial competency for ICS professionals. VGW is used in *Dev* education, and many

research studies showed the advantages of applying VGW in *Dev* which enhances collaborative capacities, knowledge, and skills. Although the benefits of VGW in *Dev* education are evident and it outperforms individual work. *Dev* Professors employ both VGW and individual work to complement each other in their courses. Creativity is the basis of human intelligence and is a significant CSF in *Dev* related problem-solving, innovation possibilities, ... It is defined as *the process by which something so judged, the production of novel, useful products, and the ability to imagine or invent something new of value*. Creativity is one of the top five competencies needed for *Dev* professionals and EA specialists, who are optimal for the *Manager's* profile (Han, Park, Hua, & Childs, 2021). The main benefits include that it improves *Dev* students' abilities and skills in communication, decision making, VGW based management, interpersonal dynamics, ... These *Dev* skills is not discipline-specific but are transferable that benefits continuous learning. Creativity has a significant role in EA and can be applicable in all it phases, including the central detailed design phase. Individual students are more creative and perform better in VGW especially in interactive brainstorming activities. VGW based creativity can be applied to design classes that can involve the following activities: EA brainstorming, Lateral Thinking, *Manager* Mind Mapping, Six Thinking Hats, Strength, Weakness, Opportunity and Threat (SWOT), UML, ADM, ... *Dev* creativity environments can used for massive education; to achieve that the *Entity* has to improve its ICS didactics (Cress, Moskaliuk, & Jeong, 2016).

Improving ICS Ddidactics

ICS education especially as a subdiscipline of pedagogy and technology, addresses the large impact of ICS in the business eco-system through its intersection with: Business, AI, computer sciences, leadership, data processing, natural sciences, and mathematics. In comparison with other types of education, ICS is a new field. Its evolution started in the 1940s, and ICS didactics focuses on the implementation of *Dev* teaching resources and for the apprehension of ICS education, there is a need for didactics to create complex concepts, like Bitcoin Block-chain Automation.

Block-chain Automation

A block-chain is an ICS model that that permits business partners to commit business transactions and to share trace information of all transactions; and it offers secure: 1) Contracts; 2) Physical and digital property; 3) Equities; 4) Government bonds; and many other types of business/financial operations. Secure peer-to-peer protocol supports e-payments in all block-chain's nodes; which needs VGW skills; and inthis RDP offers a set of LSDES recommendations that are based on the PoC.

The proof of concept

The PoC is implemented using *TRADf* and uses CSAs including the *Handle Claim Process* that comes with the *Archi* tool (Beauvoir, & Sarrodie, 2018; Jonkers, Band & Quartel, 2012); the first phase was the varication of the literature review's outcome.

The Literature Review's Outcome

The literature review outcome confirmed RQ's credibility based on the references and sources. The already mentioned ACSs based on various types of ICS for education, education services, end students' service department; and the goal is to show the possibility that *Project* can transform an *Entity* and *Dev* education, where the first step is to rationalize its educational portfolio scenario.

Educational Services Portfolio Rationalisation Scenario

The PoC selected the sets of CSAs and CSFs to satisfy *Project's* requirements; where the ACSs map to the *Entity's* strategic goals. The ADM phases, are: 1) In EA's Phase A or the Architecture Vision phase, to setup the *Dev's* educational roadmap; 2) In Phase B, it needs to setup *Entity's* target architecture and the set of *Dev's* educational requirements; 3) In Phase C or the Gap Analysis phase, there is a need for modelling a target *Dev's* educational infrastructure landscape; 4) Phase D or the Target Technology Architecture and Gap Analysis phase needs the final *Entity's Dev's* educational design capacities; 5) In

Phases E and F, Implementation and Migration Planning to evaluate the *Project's* status. *Project's* capabilities to support the PoC's execution process.

PoC's Execution

The PoC creates an AHMM4LSDES's instance which uses the selected sets of CSFs which are presented and evaluated in Table 1.

CSA Category of CSFs/KPIs	Transformation Capability	Average Result
RDP's INTEGRATION	Usable-Mature	From 1 to 10 9.0
THE METHODOLOGY	Transformable-Possible-Mature	From 1 to 10 9.0
DMS4LSDES/KMS4LSDES	Transformable-Possible-Complex	From 1 to 10 8.00
THE HISTORICAL HERITAGE AND THE GEOPOLITICAL CONTEXT	Credible-Complex	From 1 to 10 8.00
BYRUT AS AN LSDES HUB	Credible-Complex	From 1 to 10 8.00
RESEARCHED LSDES AREAS	Credible-Complex	From 1 to 10 8.00
THE ROLE OF ICS IN ENTITIES	Implementable-Complex	From 1 to 10 8.00

Evaluate First Phase

Table 1. The *Project* RDP's outcome is (rounded) 8.20.

The required ICS skills have mappings to specific CSFs and the used micro artefacts are designed using EA, and VGW and VEP. The *Project* defines relationships between the LSDES main VGW and VEP artefacts like the set of ICS educational requirements. The PoC uses the *TRADf* client's interface, where the starting activity is to setup CSAs and CSFs. After that the setup interface was activated, the scripting interface was launched to implement the needed VEP and VGW Micro artefacts to process the defined CSAs. The sets of CSFs are linked to a specific node of the HDT and the existing VEP and VGW Micro artefacts. The scripts link the AHMM4LSDES instance to the set of actions that are processed in the background. The AHMM4LSDES-based HDT uses services that are called by the DMS4LSDES actions. The *Project* instance and its related CSFs, VEP and VGW actions, were setup to be used; then the scripts were launched. AHMM4LSDES's main constraint to implement the *Project* is that CSAs for simple *Entities* components, having an average result below 8.5 will be ignored. In the case of the current CSF evaluation an average result below 7.5 will be ignored. This work's conclusion with the result of 8.20 implies that *Project's* integration is very complex but feasible, where the initial phase should try to integrate the *Dev's* curricula .and there is need to follow the recommendations.

Conclusion and recommendations

The LSDES is a high-quality confederal system which is optimal for providing multilingual/multiculturalism, and cross-functional skills for complex *Projects*; but Lebanon's geopolitical situation is precarious. The Lebanese human resources are its primal asset which is unlimited, and that can be used for complex challenges by delivering *Manager* profiles. The RDP's empirical phase proved that the RQ is credible and delivers an optimal *Manager* profile. The most important recommendations are:

TRADf is used to implement the *Project* and the literature review acknowledged a knowledge gap; and delivers a set of recommendations.

The RDP uses the AHMM4LSDES's HDT for solving problems.

This RDP confirms the need for a *Manager's* educational curriculum.

Entities can hardly cope with heterogeneous complexity, which is due to the hyper-evolution of AI, EA, and ICS. To deliver *Manager* profiles *Entities* need *Dev* knowledge and needs an optimal VGW and VEP concepts.

The staff must be capable of implementing VGW and VEP concepts.

The LSDES is optimal to deliver *Manager's* profile.

The *Manager's* profile includes Extensive training, aware of locked-in and GOFP situations, Capacities in building holistic strategies, and *Dev* hands-on skills.

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