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Using Abu Dhabi Education Council's Abu Dhabi School Model Outcomes to Reorganize Curriculum from Linear Delivery Toward a Spiral Approach

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Abstract
Curriculum delivery has a meaning learners' interaction with the designed curriculum. That is why planning of curriculum delivery is essential for teaching - learning process. This study uses a sample of 33 teachers engaged in a Professional Learning Network to examine the possibilities and purposes of a spiral design of curriculum delivery instead of a linear one with Abu Dhabi School Model (ADSM) curriculum outcomes. The authors collected the data and analyzed results using the method of purposive sampling-collection to find out the teacher's ability and interest to implement the delivery model. Consistent with findings from earlier studies of effective curriculum delivery, this study points to the significance of teachers' ownership to curriculum delivery and to the importance of meaningful patterns for differentiation and assessment. The authors also found that the incorporation of time for teachers to plan for curriculum delivery is essential. Results from the collected data show it is possible and purposeful to build a spiraling model for curriculum delivery with Abu Dhabi Education Council (ADEC) ADSM outcomes.

Keywords: Abu Dhabi Education Council, spiraling curriculum delivery, collaboration, Professional Learning Network, curriculum delivery.

Background and introduction

Historically, education in the United Arab Emirates (UAE) has developed through four phases. These are: "1) the Matawa and Katateeb, 2) Educational Circles, 3) Semi-Organized Education, as well as 4) the Modern Education System (Alnabah, 1996, p. 2)".

Mutawa means the Imam of the Mosque. In the past, the Iman taught children how to read using the Quran, Prophet Mohammed's biography and other information about Islam. The word, Mutawa referred to any person who did good by assisting others to learn the Quran and live life in an Islamic way. Mutawa held lessons in his home most of the time while richer communities set up a Katateeb. The Katateeb was what we would refer to as a school where students learned the Holy Quran, Islamic teachings, writing, reading and mathematics.

The second type of education in the UAE consisted of teachers lecturing to a group of students called Educational Circles. Scholars held the lectures on a variety of subjects. Most came from

areas like Saudi Arabia and were brought by the Sheikh and held in the mosque, palace, or scholar's home.

Following the Educational Circles, education moved into an era called semi-organized from1907 to 1953 bringing back the study of the Holy Quran and Islamic faith. The Modern system developed from these systems starting with a school in Sharjah that taught the Kuwaiti curriculum.

When the United Arab Emirates became a country in 1971, a decree declared that education was available and free for all Emiratis. Elementary education was mandatory for all students (Alhebsi, et. al., 2015). ADEC originated in 2005 under the direction of Sheikh Khalifa bin Zayed Al Nahyan, the crown prince of Abu Dhabi, with one task; to manage the schools of the emirate. ADEC developed and implemented a plan that included the New School Model which has since been changed to the Abu Dhabi School Model and 2030 Vision in cooperation with other government agencies.

Abu Dhabi School Model designates the outcomes each term for teachers. The outcomes are taught once and then a new set of outcomes is put in place for the next term. ADSM puts student-centered learning first. Students learn from exposure to "resource and technology-rich environments" in modern school facilities (ADEC, 2017). Students' different levels, styles and education met their needs through differentiation. Students develop their communication skills and become critical thinkers and problem solvers with this model.

The Abu Dhabi School Model incorporates these elements: Arabic and English instruction; monitoring of learner outcomes; and support for teachers through resources and professional development. With these elements, the students should develop their language abilities, critical thinking, and national identity learning through standardized, international curriculum and resources.

Abu Dhabi continues to work on perfecting the programs they are working with and develop activities to highlight science and technology so that the students are capable of competing worldwide. Emiratis need to be eligible for the job market as the economy expands and schools in Abu Dhabi must prepare these students to step into the market.

With that said, the purpose of this project is to study best practices of implementing ADSM curriculum learning outcomes, requiring collaboration between English and Arabic teachers. Developing a shared understanding of best ways to deliver the curriculum throughout the school community is key. Teachers in Abu Dhabi Education Council (ADEC) work in a multicultural, bilingual environment.

The research problem for this study is to clarify whether there is purpose for teachers to use a different delivery model with the ADSM outcomes. At the beginning of the 2016-2017 school year, the researchers met to decide on a plan to optimize the delivery of curriculum for the students at Sas al Nakhl Boys School in Khalifa City A. The decision came to work with a pilot project involving one or two grade levels to redesign the curriculum from a linear design to a spiral one so students revisit outcomes more than once during the year allowing for mastery. At the same time, this design has the rigor engrained, to challenge the learners continuously.

The project then proceeded in stages. The culmination of one stage brought on the next stage of the project, using the results of the previous stage as a platform to move forward. The

curriculum delivery design produced by the project uses empirical experiment and theoretical background. The timeline for this study is as follows[1]:

1. Pilot study in 2016 (Eranpalo, et. al., 2016)
2. The follow-up study in 2017, "Using Abu Dhabi Education Council's Abu Dhabi School Model Outcomes to Reorganize Curriculum from Linear Delivery toward a Spiral Approach" current study to be published June 2017
3. Ethnographic field study AY 2017-2018 "Collaborative curriculum delivery model" results to be published June 2018

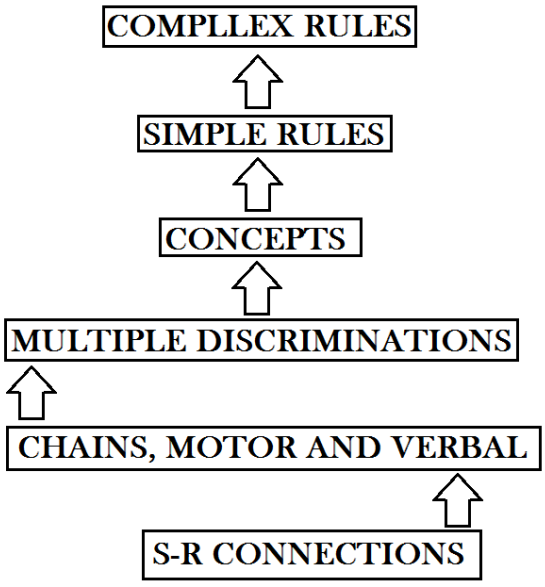
Curriculum Delivery Designs: From Linear to Spiral

The delivery of curriculum and styles of teaching are not a new concept but definitions of best practices in teaching and learning strategies are always changing. Content and curriculum taught depends on where the teaching happens, students' needs and what teachers are comfortable with in their classrooms. In the ADEC schools, the curriculum is descriptive and prescribed so the delivery of instruction by teachers determines whether a student achieves at high levels or no progress is made or worse, regression. Therefore, teachers are the key to this and must determine how to deliver curriculum to their students to optimize the educational experience.

When outcomes are taught in isolation and only once in a year, it is defined as linear delivery of the curriculum. Some teachers will do what is called "stair stepping" to make sure lower level outcomes are taught before difficult ones.

Learning influences a person's intellectual development because it builds on itself culminating with someone's intellectual capacity. A child's development depends on learning a systematic set of experiences that "stair step" using the aptitudes of the students to determine how fast and at what level to work. Evaluation of these experiences happens by looking at the abilities of students to discriminate, retain and transfer the learning. Making the idea of cumulative learning very basic at the present.

Picture 1. Example of Linear Delivery



[1] These stages of the project depend on the success of each component, and acceptance and approval from Abu Dhabi Education Council.

Arranging the outcomes in the curriculum so that they relate to one another allows consistent association with the learning. Gagne' (1965) cited that outcomes must serve as "building blocks in cumulative learning". When outcomes are put together in cumulative order, its expected students learn at a higher level and achieve success.

Linear design with effective supporting system for low performing students is a model that can drive learning to achieve excellent results in a short timeframe. The problematic part occurs when outcomes need to be revisited in case of dropout students, or simply because of difficult and time-consuming task, to be sure that the needs of all learners are taken into account and to make sure the knowledge is expanding. A solution to this problem can be found in the hermeneutic methodology.

The idea of "hermeneutic circle" is one of the classic models of teaching-learning process. Gadamer (2005) stated, "Hermeneutics refers primarily to man's natural ability to process knowledge" (p. 129). Hermeneutics expands past only being a scientific method. Understanding is inherent in people. People must understand to coexist in the World and "solve problems through language and joint discussions" (p. 207). The physicist Helmholtz believed, "according to which the tools for human mind are memory and imagination and tact, artistic sensitivity and life experience (p.6)". While doing research an understanding of the ancient hermeneutic rule is necessary, entity is understood alone and alone we can understand entity. Therefore, the sum total of all the parts is how we define our own existence called "hermeneutic circle" (Gadamer, 2005, p.29).

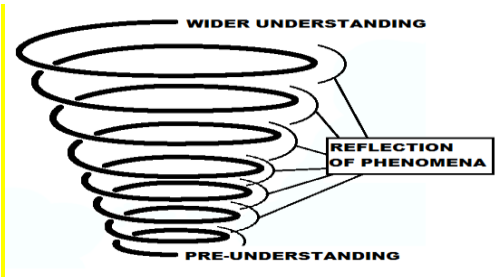
When research happens in a spiral manner, it can be referred to as "hermeneutic spiral" (Gadamer, 2005, 31). It does not mean there is circular thinking, but allows for reworking the knowledge resulting in new understanding and interpretation. All of this happens when we "explore the details of existence" (p. 32). This statement can be understood as a reference to meta- cognitive skills of a learner. A hermeneutic researcher takes into account their own prejudices and preliminary views as conditions for understanding.

Siljander (1988) gave factors related to hermeneutic spiral:

1) All human knowledge is a basic prerequisite for understanding, also known as preliminary understanding. This is the understanding that gets researchers to want more information and begin exploring knowledge (p. 115).
2) We need to understand the "relationship between the part and the whole, the dialogue between these elements" (p. 117). A true understanding of everything together only comes from knowing the pieces that make it up.
3) The temporary nature of the process of knowledge is always open, comes around again sometime, and has no end.

Thomas Bayes (1763) captured the spiral approach to interpreting knowledge visually. It was called Bayes' Theorem and is pictured below.

Picture 2 Bayes' Theorem



Simply stating to research something, you analyze new data collected related to the past experiences and knowledge. From the new understanding we get, more data is collected and we analyze this data based on our past experiences and knowledge as well as the knowledge gained with our first analysis to come up with new knowledge. The cycle keeps going and is neverending. Bayes' Theorem permits the researcher to use hermeneutic spiral to guide the study in many different circumstances. Building a spiral delivery model is clarified by looking at the Bayes' Theorum and ensures rigor within the curriculum.

Teaching the learning outcomes in spiraling way instead of linear gives us confidence that knowledge will expand, but it will also lead to meta-cognitive monitoring and controlling the learning. The development of Meta-cognitive strategies help individuals to improve their learning effectiveness and increase the motivation toward schoolwork. Educators can chart the path of students when placing learning about learning to the list of outcomes. By developing students meta-cognitive learning capacities, educators can pave the way for better learning results (Kolb & Kolb, 2009).

Collaborative planning of the curriculum delivery

In order to be effective, teaching in the classrooms requires advance planning. Yinger (1980) states the reasons to plan are "the wealth and variety of instructional materials available, the emphasis on meeting objectives of the school or the district, and the wide range of student aptitudes to be found in most classrooms" (p. 107). Planning requires teachers to be problem-solvers and decision-makers in their own classrooms, using good pedagogical knowledge of teaching and learning.

Good plan includes long term planning for the school year and term, as well as short-term planning for the school week and a single lesson. The lesson plan is where a teacher describes in detailed manner the course of instruction and the learning trajectory for a single lesson. With daily lesson plans teacher is able to guide class learning, and above all, able to adjust her teaching according to learning.

At times teachers find themselves planning for their subjects in isolation leading to plans that only include the area of expertise for that teacher. This is often fruitful and even necessary, since the teacher is the expert of her own subject. Using a wider perspective, looking at all the outcomes required in a school year, teachers need the opportunity to plan together to ensure that all outcomes are addressed and aligned for students to learn them (Connelly, F. & Clandinin, D., 1988; Putnam, R. & Borko, H., 2000). This is where collaborative planning with teachers in grade level groups comes into play.

One of the most important things professionally and educationally for teachers is to collaborate. In addition to meaningful lesson planning, teacher collaboration provides professional development, which is purposeful through a helping environment that allows teachers to alter their teaching styles and delivery of curriculum. Teacher collaboration in schools leads to higher student achievement (Ostovar-Nameghi & Sheikhahmadi, 2016). Not to mention, one of the main features and advantages of collaborative teacher work is the impact to commitment. Assertions and arguments while collaborating can be understood as commitments (Andriessen, Baker & Suthers 2013). When participant is challenged, he or her is obliged to defend own ideas in the dialogue.

The form of planning this study is implementing could be called collaborative school based inquiry (CSI)[2]. Studies show that when allowing teachers to collaborate to find answers to inquiries, the results show "better cooperation and better learning results" (Kai Wa Chu, Tse & Chow 2011).

Collaboration does not only provide professional development for teachers, it also leads to academic fulfillment. Ostovar-Nameghi and Sheikhahmadi (2016) suggested that schools:

(1) be structured in ways that maximize collaborative discussion among teachers;
(2) create conditions that are conducive to growth and development for both teachers and learners;
(3) reinforce study groups which aim at making teachers reflect on their current beliefs and practices and change them for the better;
(4) move away from the once-popular teacher training courses towards teacher study groups, peer observation of teaching and mentoring, which are conducive to constructing knowledge rather than passively receiving knowledge (p. 202).

Empirical part of the study

The empirical part of the research took place in April 2017. ADEC's School operations department sent an invitation to the principals of eight schools chosen by the Cluster managers to participate in the Pilot. Four Cycle 1 (C1) schools and four Cycle 2 (C2) schools[3]. Six principals responded in the time given and the project launched with a meeting of these principals.

This enthusiastic group decided to implement the pilot in grades four to six, to cover both Cycles. Schools choose the teachers to participate in the pilot and training sent up for these teachers during the Spring ADEC Professional Development Week. The number of teachers involved in the study and their subgroups are specified in Chart 1. Sas Al Nakhl School invited the selected teachers to attend a one-day training.

Data collection took place during the training for the study in the form of participatory action research. The training consisted of two sessions. In the first session, the teachers participated in an interactive lecture about the new curriculum delivery model with Pedagogical background focusing on differences between linear and spiral teaching-learning processes (Gadamer 1999; Varto 2005; Siljander 2014).

During the second session teacher were working in six groups by grade level and subject.

Chart 1 Study groups

C1 GRADE 4	ARABIC	4 TEACHERS
C1 GRADE 4	ENGLISH	4 TEACHERS
C1 GRADE 5	ARABIC	6 TEACHERS
C1 GRADE 5	ENGLISH	8 TEACHERS
C2 GRADE 6	ARABIC	6 TEACHERS
C2 GRADE 6	ENGLISH	5 TEACHERS

[2] Collaborative School based Inquiry (CSI) is about adopting the knowledge from the data collected (inquiry) from academics, self assessments and observations in the school and implementing this information to cross curricular (collaboration)Curriculum framework. The aim is to introduce interdisciplinary and alternative approach to curriculum delivery (Gallimore, Ermeling, Saunders & Goldenberg 2009).
[3] Cycle 1 in Abu Dhabi is students between age 5-11, Cycle 2 students between age 11-15.

The group's task was to rearrange the ADEC ADSM (Abu Dhabi School model) curriculum outcomes to match the spiral design of curriculum delivery. To deliver the task teachers received all outcomes and a modified version of ADEC curriculum map for cycle 1 and 2 schools.

The differences between original curriculum map and the modified one are, firstly in the modified one the cross cutting themes are left open for teams to determine what they are the length of time. Secondly, in the modified version, assessment and pedagogical backgrounds were added to the template. In order to achieve the spiraling approach of teaching-learning process, teachers were empowered to dismantle the patterns of ADSM curriculum. They were told to build the curriculum map for their subject against the pedagogical background given and their own expertise. The fundamental question for the action research was given openly to the teachers: Is it possible and purposeful to build a spiraling model of the curriculum delivery with ADEC ADSM outcomes?

The research team had previous experience with this type of Professional Learning Network, giving teachers the opportunity to work in collaborative manner, knowing the teachers would be eager to share their experience (Eranpalo, Jorgenson, & Woolsey 2016). As work began, the teachers proved that this was true. Braking the pattern and rearranging the outcomes made sense to all participants and their job proceeded rapidly. After two hours of group work, everyone gathered in the meeting room to wrap up the end of the day. We collected their achievements on memory sticks and gave them the final task to wrap up the Professional Learning Network, individual evaluation form with the questions:

A. What are the benefits of this delivery model?
B. What are the Challenges of this delivery model?
C. What are your thoughts after this Professional Learning Network?

Results

At the culmination of the Professional Learning Network, we analyzed the achievements and answers of the participant teachers by using purposive sampling-collection method[4]. In this example, you can see how teachers were working with the new modified curriculum map. This group had no difficulties to rearrange the ADSM outcomes so that learning spiraled.

Chart 2 Example of Curriculum map

Grade 6												
	Term 1 (14 weeks)											
Weeks	**10.9 - 14.9**	**17.9 - 21.9**	**24.9 - 28.9**	**1.10 - 5.10**	**8.10 - 12.10**	**15.10 - 19.10**	**22.10 - 26.10**	**29.10 - 2.11**	**5.11 - 9.11**	**12.11 - 16.11**	**19.11 - 23.11**	**26.11 - 30.11**
Reading	6R1.3	6R1.4	6R1.5	6R2.3	6R1.4	6R2.4	6R1.3	6R1.5	6R1.5	6R2.3	6R2.3	6R2.4
Speaking and Listening	6SL1.3	6SL2.3	6SL1.3	6SL2.3	6SL1.3	6SL2.3	6SL1.3	6SL2.3	6SL2.3	6SL2.3	6SL2.3	6SL2.3
Writing Process	6W2.3	6W1.1	6W1.2	6W1.1	6W1.1	6W2.3	6W1.1	6W1.1	6W1.2	6W1.2	6W1.2	6W2.3
Writing Conventions	6L1.3	6L1.3	6L1.2	6L1.2	6L1.1	6L1.1	6L2.1	6L2.1	6L2.9	6L2.9	6L2.3	6L2.3

[4] Purposeful sampling collection is commonly used method in qualitative research for the identification and selection of the most significant data against the research questions and phenomenon of interest.

To clarify the pattern, we have added the explanations for the outcome codes[5], to verify the achievement of the pedagogical design. This picture clearly shows the rigor of the outcomes the teachers were able to build, against the skills. This allowed teachers to set clear targets for students and use these to base differentiation.

Chart 3 The rigor of the outcomes

Speaking and Listening	Writing	Reading
6R1.3 use the reading comprehension strategy of questioning.		
	6SL2.3 communicate ideas in a persuasive poem and/or letter.	
6SL2.3 communicate ideas in a persuasive poem and/or letter.		6R2.4 explain how visual elements add meaning to print texts.
	6W1.1 plan for writing by generating ideas.	
6SL1.3 follow rules for collaborative discussion.		6R2.3 retrieve, interpret and reflect on information and ideas in a written or visual critical response text.
	6W1.2 draft and revise writing with a focus on adding and deleting for meaning.	
6SL2.3 communicate ideas in a persuasive poem and/or letter.		6R1.5 locate information or texts for a specific purpose.
	6W1.1 plan for writing by generating ideas.	
6SL1.3 follow rules for collaborative discussion.		6R1.4 self-evaluate and monitor reading progress.
	6W2.3 produce a written persuasive poem and/or letter.	
		6R1.3 use the reading comprehension strategy of questioning.

Teachers participating in the Professional Learning Network were pleased with the new delivery design. English (EN) and Arabic (AR) teachers were eager to have their say after the collaborative session. Once teachers gave their opinions on a three-question survey, a summary of the responses based on subjects and grade levels was compiled in Chart 3.

[5] In ADSM curriculum, the outcomes are marked with codes which indicate the subject, term and order. However, teachers are encouraged to plan the delivery for the best benefit of the students.

Chart 4 Survey Summary

		BENEFITS	CHALLENGES	THOUGHTS
C1	AR	More flexibility in setting the objectives.	The time for the planning is tight. We have to use PD time for this.	There should be resources for pilot schools from ADEC.
C1	EN	The delivery design is more cohesive than the old one.	Barriers (language) in co-planning between different subjects.	A lot of extra miles to run, but it'll be worth it!
C2	AR	We are building the knowledge on the previously learned! An opportunity to reach those students who have gaps in learning.	Assessment criteria will be the challenge. It should be against the rigor.	It would be great to have eSIS [the assessment program used by ADEC schools] adjusted for the pilot.
C2	EN	It will be great to have authority to arrange the outcomes.	How to integrate the outcomes between different subjects.	Why hasn't this been done before?

To summarize, the following results surfaced:

- It is possible and purposeful to build a spiraling design for curriculum delivery with ADEC ADSM outcomes.
- Responses from the participants indicates that this collaborative curriculum framework will give a kind of ownership to the teachers in planning their work, which they have longed for.
- Strong support to plans of our research team to start wider ethnographic pilot on the same subject.

Conclusion

The purpose of the project is to provide research-based knowledge for the development of the curriculum delivery at the school level and better learning outcomes of the students. Therefore, it is appropriate to raise the significance of the theoretical background of this study. To certify the results is one purpose, but equally important is to give research-based material to the PD needs of the teachers. UNESCO Learning (2013) *The Treasure Within* identifies learning through "five pillars":

1. "Learning to Know" refers to knowing facts, learning to learn gives purpose to the learning.
2. "Learning to do" means putting your knowledge into action, while learning to live is to do so cooperatively with others.
3. "Learning to exist" describes someone's responsibility to develop as a human being.
4. "Learning to choose" denotes a person's ability to understand there are more than one points of view and decide which one is in line with their own values and wisdom.
5. "Learning to live sustainably" suggests a person's ability to respect and protect the environment in which they live.

Using the five pillars learners are able to use the skills they have acquired in their everyday life. The same approach moving from isolation to a wider range of knowledge taught is representative in cross-curricular planning, done in a variety of ways within the school's curriculum. School curriculums require development of students on many levels: spiritual, moral,

cultural, mental, and physical. The curriculum must be broad enough to prepare students for their adult life and responsibilities.

While some schools limit the cross-curricular planning to specific subjects like English, mathematics, history, and science, other schools are broader with their themes including health education, environmental issues, and citizenship for example. Schools determine the manner in which themes become part of the curriculum; "themes taught through subjects" or "subjects taught through themes" (Whitty, Rowe & Aggleton, 1994). This kind of initiative is called Phenomenon-based curriculum delivery model. Teachers from different subject plan together using themes across the subjects to guide the teaching. Teachers choose these themes based on student knowledge and the surrounding environment of the school. Using this model learning views education "as a conceptual change in the interaction with the environment" (Ostergaard, Lieblein, Breland & Francis, 2010, p. 8).

Through the phenomenon based themes and cross-curricular planning, 21st century skills are addressed and students are given a wider scope of understanding. Core skills are important as well as educational views when using phenomenon-based delivery (Ostergaard,et.al., 2010). Based on the previous, an optimal way to use phenomenon-based curriculum delivery model is to use a spiral design.

A critical point of view for further research should be noted, this study was carried out in experimental conditions with a known selection of teachers. To increase the credibility, it is necessary to continue in realistic conditions, in several schools. In the article rises comprehension and connection between commitment and collaboration. From this point of view, it would be advisable to reinforce this link between piloting teachers and research team in the future. To incorporate the research team an ethnographic approach could be a constructive alternative.

Watson-Gegeo (1988) defines ethnography as "the study of people's behavior in naturally occurring, ongoing settings, with a focus on the cultural interpretation of behavior" (p. 576). Principles identified by Ramanathan and Atkinson (1999) pertaining to educational ethnographic research are:

1) Concentrating on behaviors while people are working in groups and patterns that evolve;
2) Focusing on the whole while analyzing;
3) Paying attention to theory while not letting it take over the study.

Working with an ethnographic study allows the research team to engage in the study side by side with teachers while gathering data. Ramanathan & Atkinson (1999) referred to this as "the conceptual frameworks or value systems whereby insiders both categorize and engage in their daily lived experience" (p. 48). While this is important, the team cannot forget the theoretical frameworks, concepts, and language (Geertz, 1976, 1983), as said before. The main emphasis of ethnographic research is to give a deeper and concrete understanding of the concepts studied to practical use (Hammersley 2013).

The results and conclusions of this study, modelling School based curriculum framework around spiral model of curriculum design, are consistent with findings from other similar studies (Ostovar, et. al., 2016) that show the importance of collaborative teaching and mentoring in curriculum framework. All this indicates that an ethnographic study in real teaching conditions is in place. The authors are starting a collaborative curriculum delivery pilot in a number of ADEC schools, and it will be interesting to follow the further steps of these piloting schools.

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