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Using a Next-Gen Platform and Deeply Digital Curricula to Support Alpha and iGen Learners and Their Teachers

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Abstract

Current curricula and pedagogy need to change to effectively support the learning needs of the Alphas and iGens. The Alpha Generation, children born after 2012, known as the "digital-first" generation, have grown up on hand-held, digital screens not watching television or reading paper-based books. Similarly, the iGens, also known as Gen Zs, university students born between 1995 and 2012, are the first generation to spend their entire adolescence in the age of the smartphone. "With social media and texting replacing other activities, iGen spends less time with their friends in person" (Twenge, 2017). The COVID disruption further pushed the Alphas and iGens onto screens for social interaction and learning. Returning to paper-and-pencil curricula and pedagogy does not serve the needs of these generations. The President's Council of Advisors on Science and Technology (PCAST) (2010) issued a prescient report describing the potential for deeply-digital curricula to "provide a richer and more engaging experience through interactive components, videos, simulations, hyperlinks …" (p. 77). Alphas' and iGens' deeply-digital experiences outside of school have them expecting deeply-digital learning experiences inside of school. Toward addressing the learning needs of Alphas in Kindergarten through sixth grade and iGen university students, we have been studying how deeply-digital, highly-interactive curricula plus digitally-motivated, pedagogical practices can increase their engagement and achievement in both in-class and remote learning environments.

Introduction

Research shows that high-quality curricula lead to improved student achievement (Bećirović, 2023). The Roadmap Learning platform enables educators to use skillful pedagogy to create deeply digital, motivating, and meaningful lessons, units, and whole-year curricula as well as differentiate to meet all learners' needs. This includes the Alphas and iGens. Faculty from three universities and a team of classroom teachers collaborated to further the development of the Roadmap Learning Platform, an open educational resource (OER), based digital learning environment developed by the Center for Digital Curricula at the University of Michigan (UMCDC). The UMCDC team created year-long, deeply-digital, standards-aligned Common Core State Standard curricula for the four core subjects (math, English language arts, science, and social studies) for kindergarten through fifth grade as well professional learning resources and professional learning for teachers. Over the past three years,

10,000+ children from low socio-economic-status (SES) Kindergarten through grade five schools in Michigan and pre- and in-service teacher education students, have been using deeply-digital, standards-aligned, "Roadmap" curricula. Teachers and administrators have reported increased student engagement and academic achievement as measured by surveys and tests (e.g., iReady, NWEA, M-Step, and iStation).Financially challenged schools found in low SES, historically under-served communities, struggle to pay for commercial, high-quality curricula. Toward addressing this inequity, the team's mission includes (1) creation and distribution of high-quality, open educational resources (OER), free curricula, (2) support for Michigan's Title 1 schools, and (3) enablement of equitable access for all students to grade level curricula by providing scaffolds and accommodations in the curricula and Roadmap Learning Platform. Further, Roadmaps enable teachers to easily differentiate/personalize lessons to reach each and every learner.

Curricula

With the introduction of technology, teachers are expected to integrate technology into their curriculum. Requiring more of teachers is not encouraged as witnessed by the droves of teachers leaving the profession. The uneven implementation of technology does not provide the support that students in general and the Alphas and iGens in particular need. To take the curriculum development burden off teachers, the Roadmap curricula is standards-aligned and has technology already embedded into a lesson's learning activities. Teachers can use the curricula as is, which many do, but they can also easily personalize, localize, or differentiate the lessons if desired. Teachers report: "I can't see how I would teach anymore without these curricula."

The year-long, free to P-12 schools and higher education, curricula employ a social-constructivist learning framework. The deeply-digital lessons are device-independent and browser-based; the Platform supports a range of Alpha- and iGen-aligned learning practices. For example, the Platform makes it easy for students to synchronously collaborate, e.g., a student, quarantined at home, can talk through the computer to a student in the classroom, as they work in the same document. As university students are working to create standards-based lessons, they can collaborate easily. Deeply-digital lessons are expressed as visual lesson plans. Within a lesson, a learner can literally see where learning starts, where it ends, and all the learning activities along the way. Learning activities are encapsulated in nodes; click a node and the hyperlink takes the student to a learning activity. Learning activities can point to OER or they can point to licensed, commercial materials. Our lessons are open; any URL can be included in a lesson.

Learning activities can also employ a suite of productivity tools expressly designed by UM.CDC to support Alphas and iGens. For example, as video and audio are primary media for Alphas, like text is for other generations, the productivity tools make manipulating audio, video, and drawings as easy as manipulating text. Students with special needs, who were silent in class, become actively engaged when video-recording themselves sharing their learning and telling their stories using these interactive tools. As lessons *visually* provide students with a start to finish learning pathway, teachers employ pedagogical moves to better support students engaging in self-regulated learning.

Professional Learning for Teachers

The ever-evolving landscape of education demands a nuanced approach to comprehensive teacher professional development. Ertmer and Ottenbreit-Leftwich (2023) emphasize the necessity of ongoing, job-embedded professional development that aligns with teachers' instructional practices. As most states no longer require teachers to receive additional training from the university setting, quality professional development is essential. Darling-Hammond et al. (2017) underscores the importance of continuous professional learning opportunities for educators, emphasizing high quality professional development positively impacts student learning outcomes. The Roadmap Learning initiatives echo these sentiments, offering targeted training modules that integrate current educational pedagogy and methodology that are directly applicable to the utilization of quality, engaging curricula. The shift towards deeply-digital curricula resonates with findings from Hattie (2009), who asserts that pedagogical approaches emphasizing student-centered, interactive learning environments significantly impact student achievement. This supports our emphasis on integrating the social-constructivist learning framework into our professional development modules, enabling educators to understand educational current best practice and create engaging, collaborative learning experience for their students.

Further, Mishra and Koehler's TPACK framework (2020) remains relevant, emphasizing that effective teaching involves the intersection of technological knowledge, pedagogical understanding, and subject matter expertise. Our professional development approach aligns with this framework, focusing on empowering educators to integrate technology seamlessly into their pedagogical practices. O'Reilly and Hickey (2022) emphasize the importance of personalized learning experiences, particularly for digitally-native generations like the Alphas and iGens. This aligns with our strategy of enabling teachers to personalize lessons though the Roadmap Learning platform, catering to students' diverse learning needs and preferences providing for voice, choice, and agency. Additionally, the work on Darling-Hammond and Hyler (2020) stresses the significance of collaborative professional learning communities in enhancing teacher effectiveness. Our initiatives foster collaborative networks among educators, facilitating ongoing support and resource sharing through digital platforms, reinforcing continuous growth and development.

By integrating current research, pedagogy, and methodology into our professional development strategy, we aim to empower educators with cutting-edge knowledge and skills. This enables them to harness the Roadmap Learning platform and curricula effectively to create dynamic, deeply-digital learning experiences that resonate with the needs of today's digital first learners. If you agree, here are the references for the section above. I'll fit in the ones we need.

Methodology

The Roadmap curricula differentiates between "digitized curricula" and "deeply-digital" curricula. The former are curricula that started life on paper and then were transferred to the computer with some videos and PDFs thrown in. Much of the "digital curricula" used in P-12 schools and universities are "digitized curricula." In contrast, "deeply-digital" curricula have several important properties:

- Provide multiple media: Students can express themselves using text, of course, but they can also express

their evolving understanding using animations, drawings, photographs, voice recordings and video. The learning activities should employ a full range of media like text, video, animations, photographs, and sound.

- Provide synchronous collaboration: Support for synchronous collaboration needs to be a first-class service. The ability to share materials and the ability to talk with peers (student-student, teacher-teacher, teacher-student) needs to be readily and easily accessible (Akinyemi, et al., 2019; Laal & Ghodsi, 2012). For example, in the Roadmaps Learning Platform, the phone icon enables synchronous conversations.
- Provide visual – not just textual – representations: Children in P-12 and higher education classrooms today are from the Alpha and iGen generations (What is Generation Alpha?, 2020) where visual representations are primary in their media use outside of school (Ferguson, 2020). Visual representations have been shown to lead to effective learning (Arcavi, 2003; Bobek & Tversky, 2016). As such, the visual modality or learning must also be primary. For example, in Roadmaps, students follow a visual Roadmap.
- Enable lessons to be highly malleable: Teachers will always want to modify whatever curricula is provided to them. The ability to easily make changes is critical. For example, the Roadmap Leawrning interface makes Roadmaps malleable so that teachers can quickly create differentiated lessons to better meet the needs of their students. They can also quickly localize Roadmaps to highlight their regional or geographic elements (Mahan, 2020; van de Pol, Volman & Beishuizen, 2010).
- Enable lessons to be highly interactive: The pedagogical philosophy that underpins the use of technology in the classroom is social constructivist learning (Palincsar, 1998). In this mindset, deeply digital curricula must support student learning by building, by creating, and by working collaboratively.

To analyze the Center's deeply digital curricula, our undergraduate iGen and graduate students who are pre- and in-service teachers used the criteria (below) as indicators of quality online curricula put forward by the WestEd Research Center through the U.S. Department of Education to analyze the quality of the UMCDC's deeply-digital Roadmap WestEd (2008):

- Collaboration: What is the level of student/student, student/curriculum, and student/teacher collaboration? The Roadmap Learning system has an embedded voice-over IP phone feature, which allows students and teachers to communicate and collaborate. The curricula were built for interaction and collaboration as each tool allows for students to interact with the curriculum, each other, or with their teacher.
- Engagement: To what degree are students engaged? What student and parent data supports this? Survey data gathered from multiple school districts shows 96% of students are engaged when using the Roadmap Learning platform and curricula. All anecdotal data from parents have been positive as well.
- Support Critical Thinking: What impact does the program have on learner process skills such as critical and higher-order thinking? The Roadmap Learning Curricula is deeply digital, which means that students are critically thinking and utilizing higher-order thinking skills.
- Student Achievement: What impact does the P-12 program have on student achievement? All data collected have suggested that the Roadmap Learning Platform and Curricula have increased test scores.

- Learner Outcomes: Is the curriculum standards-based? How are learner satisfaction and motivation related to the outcomes? Yes, the curriculum is completely standards-based. The learner satisfaction and motivation are related to the outcomes. We have much anecdotal evidence from students, teachers, parents, and administrators.

The Roadmap Curricula are aligned with the WestEd (2008) criteria for good curricula, so we will let the reader draw their own conclusion.

Data

The authors continue to study how well the Roadmap platform and curricula are working in the P-12 schools and higher education using the Center's deeply-digital curricula. Seamless learning is also evaluated, defined as the same curricula being used equally effectively in face-to-face, remote, and hybrid learning contexts. In what follows, test and survey data from administrators and teachers are reviewed. The learning analytics continue to be analyzed to best understand how students used the Roadmap curricula. In Figure 1, we present the graph of the Northwest Evaluation Association (NWEA) scores from one of the fifth grade teachers who has been using the Center's ELA curricula (aligned with Michigan U.S. standards) and the Center's math curricula, which begins with EngageNY Math and is designed to be deeply-digital.

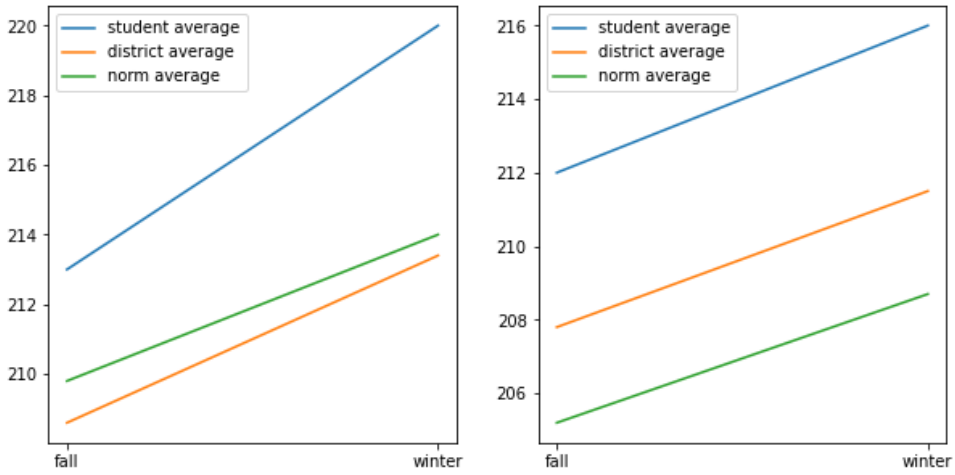

Figure 1. NWEA Scores From a fifth Grade Classroom Using Roadmaps

On the left are the scores for math, and on the right are the scores for reading for the school year 2020-21. The "student average" is the average score for the fifth grade classroom. The "district average" is the average score for a high-scoring district in the U.S., and the "norm average" is the average score for all the districts in the U.S.

In Figure 2, we present NWEA test growth summaries for the area of science education for one elementary school. Within this school, four classrooms per grade level for grades three, four, and five are represented. The number and percentage of students who met or exceeded the projected Rasch UnIT (RIT) score expectation and percentage

of project growth are provided. The Rasch UnIT is a measurement scale developed to simplify the interpretation of test scores. It is an equal-interval scale, so scores can be added together to calculate accurate class or school averages.

Fall 2021 - Spring 2022 Growth Summary for NWEA Science

Class	Number of Students who Met or exceeded Projected RIT/Number of students with Valid Scores to Measure Growth	Percentage of Students who Met or exceeded Projected R1T	The Amount of Achievment
3rd A	11/19	57.90%	118%
3rd B	10/19	52.60%	117.20%
3rd C	6/16	37.50%	93.30%
3rd D	11/18	61.10%	96.40%
4th A	4/17	23.50%	42.60%
4th B	7/19	36.80%	35.00%
4th C	8/16	50.00%	75.20%
4th D	11/18	61.10%	133.90%
5th A	11/20	55.00%	62.90%
5th B	8/19	42.10%	100.00%
5th C	3/18	16.70%	15.50%
5th D	12/21	57.10%	133.30%

Figure 2. Science NWEA Scores from an Elementary School using Roadmaps

Within our latest survey, schools responded to ten questions to explore the effectiveness of the Roadmap Learning Platform and deeply digital curricula in their classrooms. In what follows, we compare two schools: a remote-only school and one with in-classroom learning. From these preliminary data, we believe that Roadmap curricula supports the needs of Alpha generation students in both of these instances. We hasten to point out that the number of teachers surveyed in each school (26) is relatively small so statistical analyses are not possible. In what follows, then, are brief analyses of key questions from the survey:

Q1 - Two-thirds of the teachers have been making substantial use of the Roadmaps 75% to 99%; (see Chart 1).

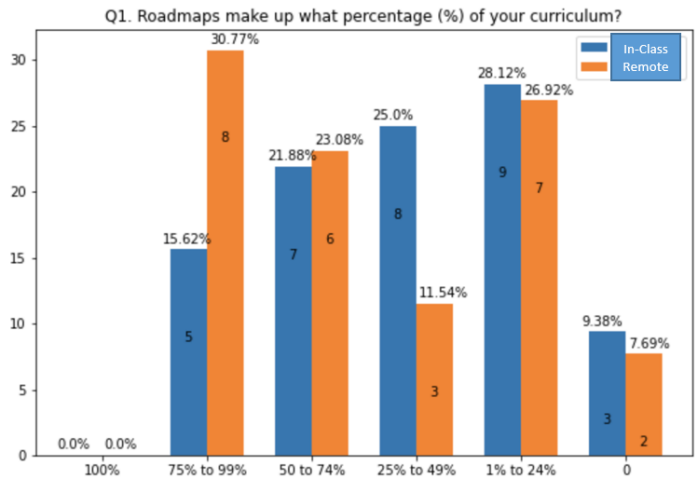

Chart 1. Roadmaps Use in Classrooms

Q2 - Two-thirds of the teachers of the teachers reported that 'things were going well' or 'extremely well,' and the difference between the two schools was 16%. Interestingly, the in-class school contributed more to the 'slightly-well' and 'not well' categories (See Chart 2).

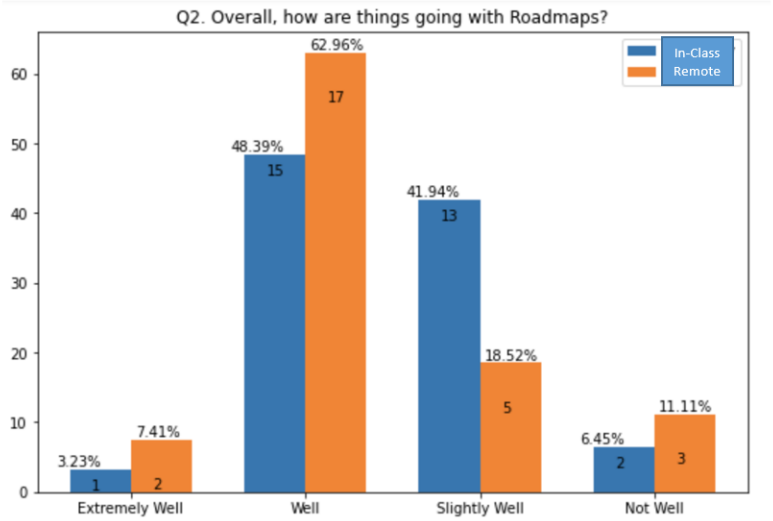

Chart 2. Teachers' Perceptions of Roadmaps

Q6 - The remote-only school reported modifying the Roadmaps more often than did the in-class school. Inasmuch as the Roadmaps were developed for in-class teaching and learning, it is reasonable that the remote-only teachers needed to do more modifying. In a follow up survey, we need to determine the extent of those modifications e.g., were the modifications merely cosmetic, were substantive changes needed, or is it something in between? (see Chart 3).

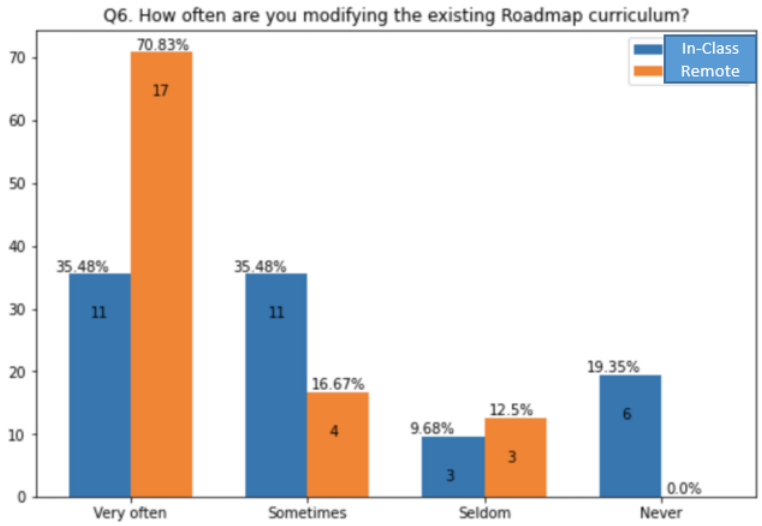

Chart 3. How Often Teachers are Modifying Roadmaps

Q9 -Only 5% of the teachers reported that their students were not engaged in the Roadmap curricula (see Chart 4).

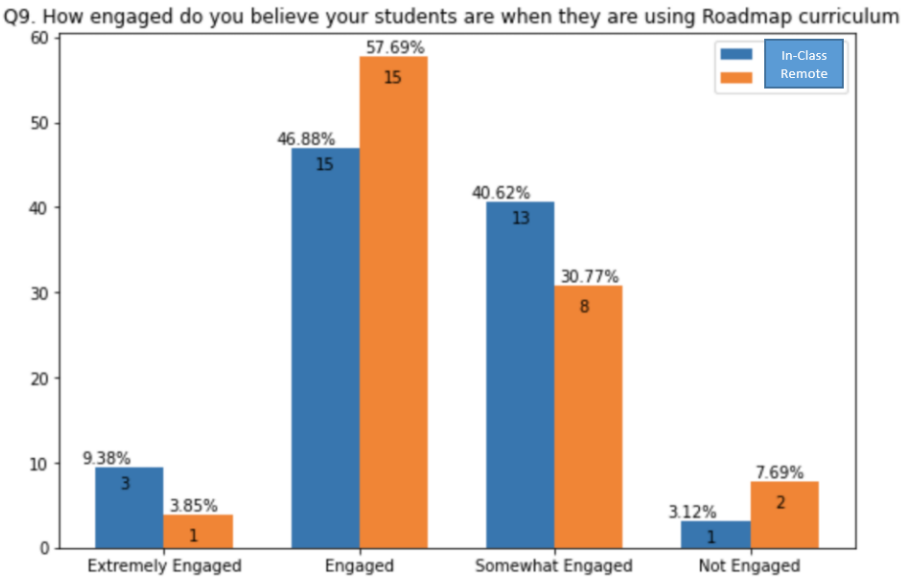

Chart 4. Student Engagement

Whether the students were in remote-only or in-class, there is a consistency, albeit with some exceptions, in the reporting with respect to using the deeply-digital Roadmaps. While more data are needed, this pilot study supports our idea that deeply digital curricula support seamless learning. The same curricula could be used for remote-only, for in-class teaching and learning, and a combination of the two where students are learning from school and at home. This is essential for these Alpha generation children.

During the school year 2020-21, in the height of the COVID disruption, in one school where the focus was on science, represented in Figure 2 above, K-5 students used the Platform with deeply-digital, Next Generation Science Standard-aligned science curricula. The Assistant Principal commented on the children exhibiting a dramatic improvement on a standardized-test in science: "…despite periods of extended school shut down and COVID-related absences… Having the learning tools and content on the Platform has been a game changer."

In an urban school, the Director of Curriculum and Instruction noted: "Our teachers and students find the deeply-digital curricula engaging… We are seeing more students progressing quicker towards their growth goals than we did prior to implementing the Roadmaps deeply-digital lessons." Importantly, instead of asking teachers to develop curricula that employ technology, our curricula have technology already embedded.

Discussion

While educators, rightfully, ask: so, does the use of technology of the sort described here have a positive impact on student learning? From the data, e.g,, NWEA data about students and the survey data from teachers presented in this article, we cannot infer causality: *because* Roadmaps were used, student achievement increased. Rather, from the correlation of increased student achievement and the use of Roadmaps in the different studies, we can only infer a "trend." Identifying a trend is not nearly as satisfying as identifying causality. That said, we can't ignore the digital orientation of the iGen teachers and the Alpha Generation students. We ask educators, then, to

have patience. It is going to take time – and considerable resources – before we can, with statistical confidence, answer the question of technology's impact.

Conclusion

Although academic years since the initial Covid disruption have seen schools and universities returning to paper-and-pencil curricula, the Rubicon has been crossed. As Kiddom, a purveyor of digital curricula observes: "Digital Curricula is Here to Stay" (Hyacinthe, 2020, p. 1). If there was ever a time for teacher educators to play a pivotal role, it is now. We must support our in-service and pre-service teachers to learn how to use deeply digital curricula effectively. Alphas and iGens are demanding it.

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