Rethinking High School Transcript Design in the Digital Age

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Problem Statement

The last few years have seen the rapid spread of digital grade reports in United States high schools (Miller et al., 2016). Marks that were once sent home in manila envelopes at the end of each term are now transmitted through online portals that can be accessed by students and parents at any time. These portals' are nearly ubiquitous in secondary schools, but research on the efficacy of constant access to students' grades remains mixed (Mac Iver et al., *Widening the Portal* 2021; McKenna, 2016; Miller et al., 2016).

There is some evidence that grade portals can help keep students accountable and parents informed, improving their academic performance overall (Brown, 2014; Miller et al., 2016). Access to updated grade reports allows parents and guardians to intervene in real-time, transforming grades from something passively received to actively constructed each and every day (Mac Iver et al., *Urban Parents at the Portal* 2021). However, the negative impacts of grade portals are also well documented. For high schoolers, increased parental involvement is a double-edged sword (Ciciolla et al., 2017; McKenna, 2016). With parents able to constantly evaluate and respond to their child's perceived academic performance, learners are stripped of some level of agency and control over their education (McKenna, 2016; Miller et al., 2016). The integration of grading into students' everyday lives can also lead to increased pressure to achieve in a very narrowly defined way (Miller et al., 2016; Wallace, 2019).

This paper focuses on the issue of agency: how and to what degree can the structure of a digital transcript build learner self-representation and self-advocacy, for all students irrespective of their families' abilities to navigate and perhaps even manipulate these digital spaces? Diminished agency and the insistence on consistent, quantifiable academic success are frequently connected to the widespread decline in high schoolers' emotional and mental health (Pascoe et al., 2019; Feldman, 2020). However, their long-term effects on secondary education aren't as frequently identified. Hyperfocus on grades places less emphasis on the process of academic exploration than on solely seeking the best possible results at the end of the term (Flaherty, 2019; Lahey, 2018;). It also de-emphasizes the importance of non-academic personal development that can't easily be measured and reported (Ciciolla et al., 2017; Lahey, 2018; Romanowski, 2004). At the end of high school, students in this environment are left with an inability to understand and express their academic experience or identity (Lahey, 2018; Kuh et al., 2006). Benefits to present academic performance aside, there are clearly some negative impacts to the state of grading in the digital age and room for improvement in the ways we serve learners during and after high school.

The demand for constant access to academic data—despite recognition of the serious drawbacks of grading portals—foretells the inevitability of their existence (Miller et al., 2016). However, we can mitigate some of these issues by changing the way grades are communicated to stakeholders (Hughes, 2020). Even more universal than the presence of digital portals at high schools across the US and Canada is the process of submitting a validated record of each student's academic performance as one piece of university applications. Transcripts serve as a central document for conveying and understanding academic success for students, parents,

teachers, admissions officers, and other stakeholders. By altering the design and creation process for this document, we can change the way grades are presented, counteracting the perspective encouraged by online grade portals. This is not to suggest that the process of grading needs to be overhauled or eliminated, a change that would require transforming secondary schools on a fundamental level. Instead, this paper suggests expanding upon the way grades are presented in order to better incorporate student voices without altering current grading and teaching models.

To do this, any new transcript design must engage students in the curation of their academic journey, offering them control over their academic representation. Participation in the creation of a document that represents their academic identity offers students the opportunity to articulate and create meaning from their own experiences (Hughes, 2020; Verhoeven et al., 2018). Current high school transcript designs largely mirror the way teachers have kept their own records for decades. These lines of grades and scores have not been adapted in any way to better communicate with students, parents, or admissions officers. Because they offer students no control over how they are represented, they don't capture and convey student experiences to admissions. Typical transcripts present grades without context or interpretation, leaving important details out.

As transcripts' design flaws are often noted by teachers, high school faculty, and even admissions officers, there have been some scattered attempts to offer alternative forms of documentation. According to Duke University's Head of Undergraduate Admissions, a few high schools across the US eschew grades entirely, instead providing admissions offices with written statements from all teachers who taught a student over the course of their career (C. Guttentag, personal communication, November 10th, 2022). This transcript design clearly eliminates the possibility of hyperfocus over grades and scores, but still does not offer students a chance to reflect on and present their own academic identity. Arguably, offering records of students' academic performance only through the highly subjective lens of their teacher gives students even less control over this defining document. Perhaps more importantly, this solution is infeasible for the vast majority of schools that do not have the resources to provide this level of in-depth feedback on individual students.

There has been one notable attempt at transcript redesign, the Mastery Transcript. Since 2017, a small handful of schools, the Mastery Transcript Consortium, has been utilizing a unique transcript intended to more accurately describe the experience at schools utilizing the mastery model (*Our story: Mastery Transcript Consortium (MTC)* 2022). Mastery or competency-based schools don't grade students by the degree to which they approach certain pre-determined performance goals, like the widely utilized standards-based model. Instead, students' school performance is reflected by their advancement through verification that they have "mastered" certain concepts (*Competency-based Learning Definition* 2014). Because of this, the academic history of a student graduating from a mastery-based school could more accurately be described by a list of the concepts they have mastered than by a series of A through F grades describing how well they have performed in each topic they've been exposed to. The mastery transcript, which supplants grades with this type of concept list is thus in some ways a better fit for these specific schools. The Mastery Transcript allows students some measure of control and

self-expression through a student's statement of who they are as learners as well as a curated portfolio of their work (*Mastery Transcript and MTC Learning Record* 2022). While this is a limited supplement to the actual metrics of their success, not an opportunity to interact with their actual academic record, it is still a step above most current transcripts in terms of encouraging students to reflect upon and engage with their education.

However, this does not make it an adequate solution for the majority of US high schools. Firstly, In an attempt to optimize the transcript for mastery schools, the design fails to consider the limited resources of admissions departments. The Mastery Transcript excludes grades, intentionally does not provide a GPA or other guiding metric, and relies on admissions officers to choose to look at the portfolio as an integral aspect of the transcript, something they are at times hesitant to do (C. Guttentag, personal communication, November 10th, 2022). More broadly, the transcript presupposes radical changes in education that are currently impractical for the vast majority of high schools in the US. Rather than providing a new representation of a student's experience, adopting a mastery transcript means committing to a different educational model one without grading and where students move at their own pace (*Competency-based Learning Definition* 2014; Barnum, 2020). With the prospect of eliminating grades entirely and creating asynchronous classrooms not on the horizon for most high schools, the Mastery Transcript is extremely limited in scope (Barnum, 2020).

This project seeks to provide an improved high school transcript design tailored not to the needs of teachers' record-keeping or to the needs of niche educational models but to the experience of all stakeholders, especially students. The objective is to utilize UX best practices and research within education to help learners most genuinely represent their educational experiences, both for their own development and for more successful communication of their academic journey to others during and after high school. However, unlike previous alternative transcripts, the resulting document must also be broadly applicable to different educational models and student experiences and have low barriers to adoption especially given the diversity of stakeholders and their varied comfortability with instructional technologies. This means that it must integrate seamlessly within the current admissions framework and provide the necessary flexibility to capture a wide variety of student experiences across numerous educational models, among other functional demands. To successfully communicate with outside evaluators, the design must balance providing space for curation and expression while maintaining the reliable validated nature of transcripts upon which universities rely. Such a transcript doesn't pit student influence as a hindrance to getting the "real" picture of each student but instead positions it as a necessary contribution to accurate representation.

It is also worth noting that, given the current state of college admissions in the US, in order to be deemed successful or worthy of implementation, potential transcript designs must also focus on addressing the inequity of acceptance into higher education to the greatest degree possible. The design of transcripts alone may not be nearly enough to resolve educational inequities at all levels, but by representing the value learners generate from the diverse opportunities they are afforded, a successful design would also mitigate some concerns with how students are currently evaluated by colleges and other institutions after graduation. Additionally,

a successful design will reduce the need for students to have technology- and education-savvy parents or paid college counselors advising them on intellectual self-authorship. While equitable representation is not the sole purpose of the transcript redesign, it is a crucial outcome derived from more in-depth communication between learners and those evaluating them.

Digital academic records can diminish the student experience, as seen in the case of grade portals. Easy access to in-time evaluations can help students and parents to respond quickly to changes in academic performance and spot areas where learners' skills and knowledge are ripe for improvement, but they can also put an undue emphasis on the importance of these numbers as the sole arbiters of success or failure (Mac Iver et al., *Urban Parents at the Portal* 2021). As long as students and the authority figures that surround them know that grades and scores are the only way their educational background is conveyed to universities, their prioritization of these numbers over their mental health, the discovery of their academic interests, and learning outside of the classroom will remain the norm. It is a reasonable response to the current framework of communication between all the stakeholders. By adding the student voice to transcripts it is possible to return a sense of agency to students and—without dismissing the importance of academic performance or losing the transcript's function as a validated report of grade outcomes—open the doors to new conceptions of learning (Hughes, 2020). Digital grade booking has over the last few years changed the way students, parents, and teachers interact but the sudden access to educational data that digital tools provide also has untapped potential for developing transcript that is more consistent with its purpose.

Design Objectives

The Transcript as a Developmental Exercise for Students

Goals: to help students find their identity and purpose, to prepare them for the self-determination expected of them in their future

Traditional transcripts are, at their core, a means for schools to communicate students' overall academic performance to students, parents, and external evaluators such as college admissions departments. They represent a summative assessment of students learning, knowledge, proficiency, or success at the conclusion of each term and are almost exclusively evaluative in nature (*Formative and Summative Assessments* 2017). In contrast, our redesigned transcript should serve a dual purpose as both documentation of accumulative academic achievement and as a formative exercise in self-discovery.

Within developmental and cognitive psychology, the theory of narrative identity asserts that "people living in modern societies provide their lives with unity and purpose by constructing internalized and evolving narratives of the self" (McAdams, 2001). During adolescence and early adulthood, we begin trying "to reconstruct our personal past, perceive our present circumstances, and anticipate the future in terms of an internalized and evolving self-story" (McAdams, 2001).

As upon graduation, it is expected that they understand their interests and purpose enough to determine their educational and professional future, opportunities for self-reflection in an academic context are crucial to students' development. Participation in the creation of a document that represents their intellectual identity offers students the opportunity to articulate and create meaning from their own experiences (Verhoeven et al., 2018). By providing an easy-to-use and intuitive transcript and interface we can facilitate this by lowering the barriers to entry and usage. This means that students shouldn't need counselors, consultants, or other mentors to navigate and respond to the reflective prompts, therefore further amplifying students' voices. Our transcript should provide students with the tools and the freedom to interpret experiences from inside and outside of the classroom that have influenced their past learning and future interests, supporting them as they develop an integrative narrative of self.

Design Choices Based on This Objective:

- Allowing students to curate a portion of their transcript and integrate their extra-curricular pursuits with their course history encourages students to reflect on the experiences that have influenced their intellectual journey.
- Providing students with the ability to include interests and desires that lie ahead gives them a space to explore their purpose and determine their educational future.
- Offering a representation of their high school experience that emphasizes linear travel through time guides students toward developing a self-story
- Making their transcript available to students throughout their time in high school offers them the ability to adapt their self-narrative slowly as they change and grow but also allows students to choose their courses and activities based on their past development or future goals.
- Providing an intuitive transcript and interface design with low barriers to entry should eliminate the need for school counselors, paid consultants, or other mentors to complete their transcripts.

The Transcript as a Genuine Representation of Students' Intellectual Identities

Goal: to help students convey their intellectual identities, to restore their agency within their educations, to contextualize their academic records

Asking learners to engage with a document that many high school students already view with nervousness or contempt is no small feat but it is made even more difficult by the perception that transcripts don't reflect the reality of the student experience. Not only does the traditional sheet of courses and grades fail to capture the nuances and context of their academic performance but the scattered materials that supplement it within a college application—a list of extracurricular activities, some demographic information, optional standardized test scores, one or two essays, and maybe an interview—do not clearly connect to each other (*Quick Guide: The*

anatomy of the college application 2022). According to Christoph Guttentag, the head of Duke University admissions "We're looking for students who have a voice, take initiative, go after their interests…and who will be really involved on Duke's campus and after [they graduate]" (personal communication, November 10th, 2022). Clearly, colleges are taking a holistic approach to admissions, but the piecemeal application process doesn't reflect that. This means that when students turn in their college applications they have to hope that an anonymous evaluator will connect the dots across their various application materials and get a sense of who they are and what they are passionate about. Instead, in a more effective application process in which student agency is granted a degree of importance, each student would have the opportunity to convey their own intellectual identity, treating their transcript as evidence of their academic growth, not the sole way to communicate it.

Two common cases where even a small amount of student input could have a major effect on the way an admissions officer might interpret a student's transcript come to mind right away. In some instances, a student's application might benefit from offering more information regarding a specific course or grade. For example, an admissions officer might interpret a "C" grade differently had they seen that while the student struggled at the beginning of the semester, but improved during the course, mastered the content, and scored highly on their final exam. In the second case, a student may wish to offer a broader idea of how or why they prioritized certain activities. Again, an admissions officer might read a "C" grade differently if it is in a crucial math class for a student interested in engineering than for a student interested in theatre who took a challenging math class outside of their comfort zone. Typical transcripts present grades without context or interpretation, at times leaving important details out.

Future use testing is required to determine the extent to which this supplemental information informs the application reading process, but by providing a more complete picture of each student, schools have the potential to improve student-university 'fit'. Offering students the opportunity to genuinely reflect on both their successes and failures during their high school years not only incentivizes their honest participation in communicating their academic experience, but it also has the potential to help universities select students who reflect the values, skills, attitudes, perspectives, or experiences they are looking for. Universities are often looking to determine students' likelihood of thriving within their specific college environment and this design should amplify students' identities and developmental journeys. For some students, high school grades and courses may be a good reflection of this, but for others, both they and the universities they apply to might benefit from the opportunity to include a wider range of information.

Design Choices Based on This Objective:

- Allowing students to curate a portion of their transcript and to integrate their extra-curricular pursuits, interests, and other supplementary evidence gives them an opportunity to highlight their academic strengths which might otherwise get lost in their larger transcript.

- Providing a space for students to describe themselves briefly, helps communicate how they see themselves and how they hope any evaluator will see them, priming the reader to "connect-the-dots" in the broader transcript.
- Creating an opportunity for students to annotate their grades and courses helps to place both their successes and failures into perspective for an otherwise unaware evaluator.
- Integrating extra-curricular pursuits gives students with an educational or professional background outside their high school classroom the opportunity to present alternative forms of education (art classes, acting classes, classes taken at a nearby college, relevant internships, etc.) as just as significant as the courses offered by their high school.
- Enabling students to present multiple interests or possible future paths so as not to limit them to a single passion while still encouraging them to weave their experiences into a few meaningful self-narratives.

The Transcript as an Efficient Form of Communication for External Evaluators

Goal: to succinctly provide crucial information about students, to maintain the validity of the transcript

Despite the vast majority of colleges considering non-academic factors such as personality, context, and values during the application process, aside from a short essay or two on any topic and maybe an alumni interview there is very little from which they are expected to glean this information (*Future Admissions Tools and Models: Insight into nonacademic factors and practice* 2016; *Quick Guide: The anatomy of the college application* 2022). With only minutes to read each application, admissions officers benefit from a design that directs their attention to the most important areas including both academic and extracurricular information (Milan Hamilton, personal communication, November 10th, 2022). By allowing students to offer some semblance of hierarchy to the importance of their various courses and activities, this design should help admissions prioritize their time and attention on the areas that matter most. However, for ease of adoption, this design should also offer all the same information in a similar presentation to a traditional transcript design. This will also serve any readers of the transcript beyond university admissions such as parents, employers, and technical school admissions who may not have expertise in education or technology or who may be looking for specific numerical metrics, not a comprehensive report of a learner's education. The redesigned transcript shouldn't serve to eliminate any of the information currently included in most school transcripts but to supplement it and alter its presentation and perception.

Along this same vein, a successfully redesigned transcript will maintain the confirmed validity of an official high school transcript. While college applications rely on student self-reporting in other areas of the application such as extracurriculars, grades and courses have always served as a concrete record of student academic success as provided by the school (Sanchez & Buddin, 2016). To serve the same purpose as current transcripts and be respected as a document to the same degree, grades and courses must be confirmed to be accurate by the high

school providing the transcript even if this requires additional or alternative steps on behalf of the school.

Design Choices Based on This Objective:

- Including a complete list of courses and grades, just as in a traditional transcript format, prevents students from "hiding" information while still allowing them to highlight important elements.
- Offering the option of a more traditional transcript view encourages adoption and equal consideration even among schools that have limited admissions resources and time to adapt to a new transcript format.
- Providing a system through which schools provide course and grade information and send official transcripts directly to colleges with students merely shaping the way that information is presented when the transcripts are sent.
- Allowing schools to include a signature of approval by a counselor or faculty member to add an additional level of validation to the document which may include clubs and extracurriculars, students' statements, or other submitted information at the schools' discretion.
- Giving students a space to briefly describe what they want admissions officers or other evaluators to take away from their transcript.
- Providing a clear hierarchy of information, as determined by students, to convey what information is most crucial and where evaluators should focus their limited time and resources.

Designing for Equity & Accessibility

Goal: to minimize inequities in how students see themselves, depict themselves, and are evaluated, to provide an interface for transcript creation that is usable for all students regardless of ability

Unlike the aforementioned priorities, maintaining or reducing the existing inequities in college admissions and meeting all relevant accessibility standards are not objectives to be maximized but constraints that need to be met for the transcript design to be acceptable.

Design Choices Based on This Objective:

- Ensuring that the finished transcript design meets all Web Content Accessibility Guidelines as set by the W3C as does the transcript design interface upon its completion (Henry, 2022).

- Ensuring that the finished transcript will not disproportionally impact students' admissions negatively or in a way that increases current inequities in college education as clarified in more detail by the testing plan.
- Integrating courses, extracurriculars, paid and unpaid work, and other formative experiences together unconsciously presents them as potentially of equal value, giving students deserved credit for taking advantage of the unique opportunities they are afforded.
- Providing a system of highly flexible classifications of activities allows for greater inclusion of non-traditional academic and non-academic opportunities beyond high school courses, high school-run clubs, and sports teams.
- Offering clear prompts in conjunction with infinite possibilities for creative expression is intended to eliminate the unspoken rules of college applications that are not equally understood by all students.
- Emphasizing simple design and thorough testing place a special significance on the ability to engage with the transcript without help from a college-educated parent or guardian or from a paid/highly involved college counselor.

Transcript Design

After determining the objectives of the transcript design, we began the process of iteratively prototyping potential transcript designs with different models for representing students' journeys. Each model has unique benefits and weaknesses and in developing a final product that is simple enough for a student to create and admissions officers to quickly understand but also coveys sufficient information about each student, some significant trade-offs had to be made when combining these preliminary prototypes into a final transcript design.

Preliminary Prototypes

Images of each type of prototype listed below are included in Appendix A while two prototypes that combine these preliminary models appear in Appendix B. Please note that some of these prototypes would be considered medium-fidelity while others appear to be unfinished. This reflects the various degrees of development each model reached before either being discarded or adapted and incorporated into another prototype.

Hex Timeline (Fig. A1)

As the first prototype, this transcript represents an aesthetically pleasing but completely infeasible design where students' accomplishments are somehow fitted into a bunch of small hexagons. While this design does place these hexagons in chronological order, encouraging

students to develop a self-narrative, it provides no obvious differentiation between classes and extra-curricular activities, a concern specifically noted by college admissions (Christoph Guttentag, personal communication, November 16th, 2022). The hexagons' sizes and shades have no particular meaning for the transcript, a missed opportunity for visual communication that will be exploited in future designs. While not very practical due to the variability of the information and evidence students may wish to provide, this design does establish some of the general features that will appear again and again in these designs.

Card View (Fig. A2)

This transcript where student courses, achievements, and related evidence are organized into large cards and grouped chronologically by year is much more feasible but perhaps the least visually compelling of all the preliminary designs. Because of the size and orientation of the cards, even if a student were to include very little supplemental evidence there is no good way to get an overarching sense of areas of interest or strength for the student with a quick glance at the transcript. College admissions also noted that this design would be difficult to evaluate quickly because though there is some differentiation between courses and extracurriculars, there is no categorization by subject (Christoph Guttentag, personal communication, November 16th, 2022). However, this design does include a toggle switch in the upper right-hand corner, suggesting that the transcript can be switched to another view. This mechanism was eventually implemented in the final design as it allows for easy adoption and can be used in contexts that require a very standard transcript.

Vertical Timeline (Fig. A3)

Of the preliminary prototypes, the vertical timeline design most emphasizes the importance of the order and relative time of a student's experiences. Although, it has a central flaw in that it requires long-term experiences to be mapped to a single point on the timeline. Additionally, there are practical concerns with the difficulty of including several important events and related evidence that occurred over a short span of time and with the fact that there is no way to both maintain the timeline structure and effectively group experiences by subject. This design also incorporates icons to differentiate between different types of experiences which offer an instantly recognizable overview of how a student spends their time but these would be eliminated in future prototypes due in part to space concerns and because they limited the type of experience a student could include.

Mortarboard (Fig. A4)

While a bit more aesthetically pleasing, this design which includes both a vertical timeline and a mortarboard-style wall of experiences has a lot in common with the hex timeline and the card view prototype. A "mortarboard" describes an organizational structure in which elements with

different dimensions are fitted into a compact grid structure such that they cover the whole space. This format works well for elements such as photos that can be cropped slightly to change the dimensions without altering the overall meaning of the element too significantly. However, that is not the case with the cards included here, making it very unlikely that a compact grid could be created from student experiences where the height and width of each element depend on variable student inputs. The mortarboard design also shares the issues regarding the difficult nature of differentiating classes and extracurriculars and getting a general sense of students' areas of interest mentioned about the card view design above. One feature of this design that would be incorporated into the final design is the image galleries for work of a visual nature. Having these galleries so easily accessible draws in the user and encourages them to further explore a students transcript in a way that a link to an external portfolio simply does not.

Gannt Chart (Fig. A4 and A5)

The primary benefit of a transcript organized into a Gannt chart format is its unique aptitude for capturing the duration of various student experiences. While some designs like the vertical hex timeline offer no sense of the amount of time a student spent participating in a course or activity, others such as the card view and vertical timeline only record the duration through a small set of written dates, not reflecting it visually. While not shown in Figures A4 and A5, this design could also easily incorporate groupings of activities and courses by subject as well as differentiation between extracurriculars and classes. Yet, the Gannt chart design also has significant deficits. Most notably, it provides very little information on the surface requiring a reader to interact with the experiences listed one by one, an inefficient process that could discourage admissions offers from exploring a student's transcript in-depth. In the end, we decided to de-prioritize reflecting the duration of students' experiences in favor of designs that better emphasize student evidence and statements regarding their experiences.
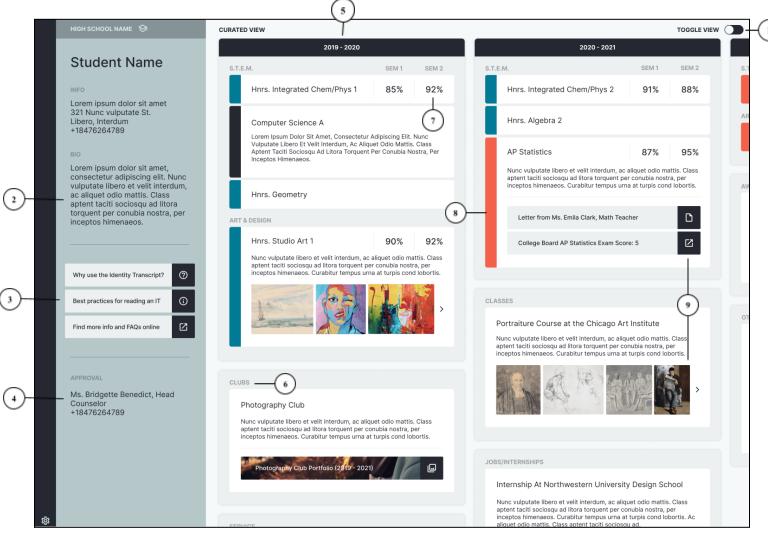
Final Design

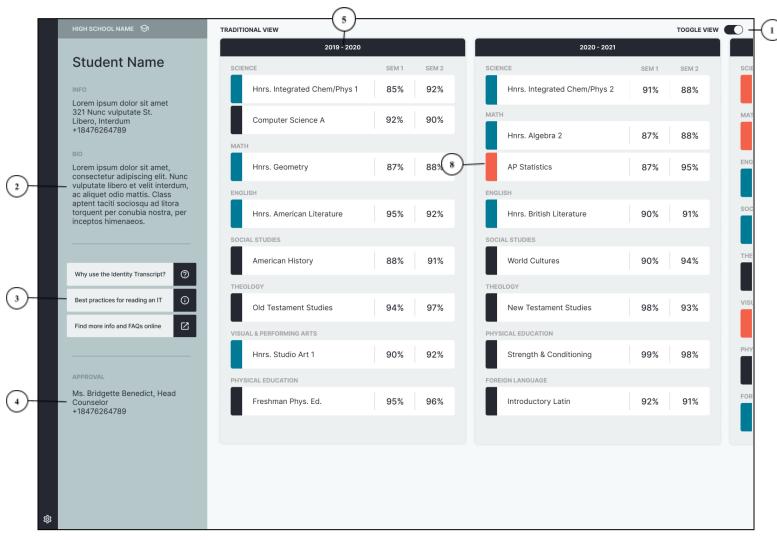Figure 1. The student-curated view of the redesigned high school transcript

Figure 2. The traditional view of the redesigned high school transcript

Functional Attributes

This list highlights specific aspects of the redesigned transcript featured in Figure 1 and Figure 2 that help to achieve its design objectives.

1. Toggle view - Using this switch, the user can view either the default view which includes the classes a student has identified as central to their academic journey, relevant extra-curricular activities, and evidence of their strengths or other information regarding their student experience, and a more traditional transcript view which includes a complete list of course they took and the grades they received with no supplementary materials (Fig. 2). We chose to make the curated transcript the default view in order to encourage evaluators to explore the attached materials and get a sense of who the student is, even if they may eventually wish to switch to the view they are more comfortable using, balancing student's desire for more genuine representation with admissions departments demands for efficiency.

2. Student statement - This short blurb offers student's the opportunity to freely describe themselves as a student or otherwise speak to their academic experience. Its placement on the left-hand side of the transcript encourages evaluators to read it first and use it as a frame, shaping their understanding of the rest of the transcript.

3. Evaluator assistance - Despite its intuitive design, there will surely be some questions regarding the meaning and reasoning behind the altered transcript design. The buttons make it easy for users—students, parents, educators, and admissions officers—to learn more about the document and can also be used to determine how many users do seek extra help, allowing us to recognize and improve areas of confusion over time.

4. Counselor verification & approval - Each student's list of courses and grades is automatically fed into this transcript from school records, just like a traditional transcript, but this feature allows schools to provide verification of the other information included in the student-curated portion of the transcript. Currently, the major college application services do not require students to provide proof of their participation in extracurriculars or faculty testimonials that the work included in any portfolio or supplement is their own original work. Choosing to have an advisor or other knowledgeable faculty member look over and attest to the accuracy of a student's self-reported activities, projects, and awards would therefore allow schools using this transcript to go above and beyond current expectations for the verification of student's experience outside of the classroom.

5. Chronological scrolling structure - As this transcript is intentionally designed to reflect students' self-narratives, in both the curated and traditional views courses are ordered chronologically and grouped by year instead of grouped by subject. This means that by reading from left to right, a user gets a sense of how students progressed and developed in their interests over their four years of high school as well as how they plan to continue doing so in the future. The views that are shown here report semester grades from left to right as well, however, this is easily adapted to schools that use a trimester or quarter system by simply extending the card for each class to include the additional grading periods.

6. Activity distinction, inclusion, & custom labeling - In order to balance admissions officers' desires to represent clear distinctions between high school coursework and other activities with a design that reflects the importance of learning outside of the classroom, the different experiences students can choose to include are grouped together (Christoph Guttentag, personal communication, November 10th, 2022). Students have the ability to label these groups as they see fit—examples include "classes", "clubs", and "personal projects"—making the curated view extremely inclusive. Students also have the ability to name and alter the subject groupings of their classes. For example, in the traditional view (Fig. 2) of this fictionalized example transcript, classes are organized into long-standing and common subjects such as "science", "math", and "visual & performing arts," reflecting how a student's high school might group classes. However, in the curated view above, courses have instead been grouped into the categories of "S.T.E.M." and "art & design", reflecting how the student sees connections between their classes.

7. Selective info regarding courses - While the traditional transcript view includes all courses and grades a student receives, in the curated view students can highlight different aspects of their courses by selecting what information to show (or omit) from their transcript. For example, this student has included their grades for AP statistics but not for Honors Algebra 2. This allows the student to show how much improvement they made or how well they performed in AP Statistics while also reflecting that they took the opportunity to take the highest level math class available to them, even if they did not necessarily get the best grade in the course. Allowing students to determine whether they'd like to highlight their participation, improvement, performance, growth, or other qualities encourages them to see the different benefits a class may provide even if they don't score highly in it.

8. Course-level color coding - Each course is color-coded by level to give the transcripts viewer a visual overview of the areas in which a student improved or pursued more challenging courses. In this example, especially in the traditional view of the transcript shown in Appendix B, an evaluator can quickly see the change from dark blue, to teal, to red in the areas associated with science, math, and the arts, providing an instant sense of both what opportunities a student took advantage of and what areas they explored in greater depth.

9. Multimedia evidence - Much like giving students the ability to choose whether their grades for each course are visible in their curated transcript, allowing students to include a variety of written and visual supplements promotes a broad view of the value of educational experiences beyond hyper fixation of grades. A student who develops a strong relationship with their teacher or who showed grit and commitment in a course that personally challenged them may wish to submit a statement of support from their teacher. A student who participated in an art class outside of their high school that isn't graded might benefit from showing the work they produced during the course. Allowing students to demonstrate their learning in many different ways encourages students to focus on learning rather than achieving the highest possible grade. Further, it offers admissions officers a fuller picture of student achievement by providing evidence of success in areas where a grade isn't provided.

Usability Testing Plan

The tests outlined below are intended to determine the feasibility of the current transcript design, to verify it is meeting the project constraints, and to determine the degree to which it meets the aforementioned project objectives. This testing is episodic and applied so as to continue to iterate on the transcript design as the project progresses.

Preliminary Testing

Goal: to collect primarily qualitative feedback from the perspectives of each group of stakeholders in order to improve the current transcript design

Students:

After asking a class/small group (20-30) of high school seniors to complete the curatorial aspect of the redesigned transcript as a one-day activity, the students will be asked to fill out a survey including:

- Likert scale questions asking the students to what degree they felt the new transcript genuinely represented their experience and identity
- Likert scale questions asking the students to rate how easy various aspects of the transcript creation interface were to use
- open-ended questions asking the students what aspects of the transcripts limited its ability to represent them as a student, how they would change the transcript to make it more representative, and what (if any) aspects of the transcript or interface confused them

Admissions Officers:

After asking a small group (5-10) of Duke admissions officers to briefly review a fictionalized example of the completed transcript for a potential college applicant, the officers will be asked to fill out a survey including:

- Likert scale questions asking the admissions counselors to rate how much less or more difficult and/or time-consuming such a transcript would make reviewing a student's application (on a scale from much more difficult/time consuming to much less)
- open-ended questions asking the admissions counselors what information or aspects of the transcript were not helpful to them and what other information they would like to see included in the transcript and why

Parents/Guardians:

After asking a small group (10-30) of parents of high school students (diverse in age, gender, race, socioeconomic status, education level, number of children, ESL speakers, and ability) to briefly review a fictionalized example of the completed transcript for a student at their child's high school, the parents will be asked to fill out a survey including:

- Likert scale questions asking the parents/guardians to rate how much less or more difficult such a transcript would make understanding their students' grades and holding their students accountable
- Likert scale questions asking the parents to rate how easy various aspects of the transcript were to understand
- open-ended questions asking the parents what information or aspects of the transcript they would like to see included in the transcript and what aspects (if any) were confusing

Expanded Testing & Metadata Collection

Goal: to collect qualitative feedback from more representative groups of stakeholders in order to continue to improve the transcript design, to begin gathering quantitative objective metadata on stakeholder's interactions with the transcript design

Students:

After asking a few (2-3) classes of high school seniors at a small number (5-10) schools (diverse in privatization, racial makeup, socioeconomic makeup, the proportion of ESL speakers, religious affiliation, educational model, and graduation rate) to complete the curatorial aspect of the redesigned transcript across a semester as a class assignment, the students will be asked to fill out a survey including the same questions as the preliminary testing stage and:

- a binary question asking whether they would prefer to turn in their current school transcript or the redesigned transcript as part of their college application or use it for employment, technical school, or other applications post-high school
- an open-ended question explaining their answer to this question

Additionally, students will be informed that through their use of the online transcript creator we will collect additional data including:

- number of logins to and time spent using the transcript creator
- number of times checking the supplemental help information
- copies of students' completed transcripts (with all personally identifiable information—including names and addresses—removed)

Admissions Officers:

After asking a small number (3-5) of admissions officers at a range (5-10) of schools (diverse in size, privatization, prestige/ranking, racial makeup, socioeconomic makeup, and acceptance rate) to read, in full, a complete fictionalized application for a college applicant including the redesigned transcript, the officers will be asked to fill out a survey including the same questions from the preliminary testing and:

- a multiple-choice question asking officers whether they would accept, waitlist, or deny the student's application (they can also select that the decision would require further discussion)
- an open-ended question asking them to briefly explain their admissions decision

the officers will be informed that through their viewing of the transcript we will collect additional data (without personal identifying information) including:

- time spent reviewing the complete application
- time spent viewing the transcript
- clicks/interactions with the transcript (what information was opened and/or scrolled through and for how long)

Final Validation

Goal: to confirm that the final design meets all the project constraints before running a pilot program, to run more complex tests of objectives involving multiple stakeholders

Objectives:

After randomly assigning a number (7-12) of admissions officers at a range (10-20) of schools (diverse in size, privatization, prestige/ranking, racial makeup, socioeconomic makeup, and acceptance rate) to one of two groups: traditional transcript and redesigned transcript, we will ask each officer to read, in full, a complete fictionalized application for a college applicant including either a typical or redesigned transcript depending on their assigned group. The officers will then be asked to fill out a survey including the same questions from the second, expanded stage of testing and the same metadata will be collected. With this experimental design, we will be able to compare the acceptance decisions for students with and without the transcript as well as the demographic information of the fictionalized students in order to confirm that the finished transcript will not disproportionally impact students' overall admissions negatively or in a way that increases current inequities in college education.

Accessibility:

Using a simple visual checklist provided by the W3C, we can verify that the finished transcript design meets all Web Content Accessibility Guidelines for PDFs as well as those for websites broadly (Henry, 2022). Upon completion of a fully functional transcript and transcript creation site, we will validate these results by also running automatic web-based accessibility testing on the sites.

Recommendations for Future Development

The above testing plan should provide enough evidence of the efficacy of our redesigned high school transcript to justify a small pilot program, allowing real schools to begin using and submitting the transcript to college admissions departments. However, it is only the beginning of the required testing for implementing such a large-scale project. The three stages of testing outlined above focus largely on the experience of individual users with creating and reading the transcript but once the transcript is launched, further stages of assessment will need to be developed focusing on the impacts of this new approach to reporting students' academic performance at a systems level. While it will take some time, after launching the transcript, we will be able to collect large datasets from students and admissions departments in order to determine the transcript's impacts on the diversity of admitted students, the efficiency of admissions office processes, and even postsecondary academic outcomes upon and after graduation. To determine if the project is successful in improving student-university "fit" these are all important metrics but ones that can't be evaluated until we have more data and data from actual students as opposed to fictionalized student profiles.

In addition to further assessments, the plan for launching the redesigned transcript will require further development after the design has been finalized. In order to be successful, any changes to a process as high stakes as college admissions will require deep buy-in both from both students and their parents and university admissions departments. To achieve the level of credibility required to instill trust in all stakeholders, there are several paths we could explore. First, we might benefit from seeking the approval or even endorsement of a large, high-profile, and long-standing educational organization such as the National Educational Association. This may help convince both the universities that will potentially receive redesigned transcripts from future applicants and high schools that will potentially be putting their students' futures on the line by submitting newly redesigned transcripts that the design has been thoroughly researched and has the support of experienced educators. Alternatively, we might consider partnering with a single university or small group of universities to promote and collect data on the results of using the transcript. With some evidence during preliminary testing that the redesigned transcript is beneficial to students' attitudes towards learning, increases diversity in admitted students, or results in improved postsecondary academic outcomes there is even the potential to seek grant

money to incentivize university involvement in further research. With many schools in search of further resources for their admissions departments, the opportunity to both take a deeper look at their admissions processes and increase their efficiency, all while receiving increased funding would be an enticing offer and a good way to develop the initial buy-in necessary to launch this project.

      Other resources should also be utilized when determining the best way to roll out this redesigned transcript. For one, there are hundreds of experts in digital product design and launch who could be extremely valuable in determining the best way to announce and market the new transcript. Recruiting these experts from the private sector and into academia could be difficult and is another example of an area where grant money could be used effectively. This transcript redesign also has the great advantage of coming well after the successful (if limited) launch of the Mastery Transcript. While we have previously noted their limitations when it comes to changing the nature of college applications for the vast majority of US high schoolers, invaluable lessons can be learned from how they chose to launch their transcript design. As a non-profit focused on educational reform, there is a good chance they would be willing to share some of the more effective strategies for firmly establishing themselves as a transcript accepted by hundreds of top universities. They could serve as a great example for some of the first phases of project roll-out even if the hope is that this design will eventually see wider adoption amongst high schools. Whether with the Mastery Transcript Consortium, individual universities, academic non-profits, or others, developing partnerships and building trust with stakeholders will be key factors in the success of implementing an authentic, efficient, and equitable high school transcript design.

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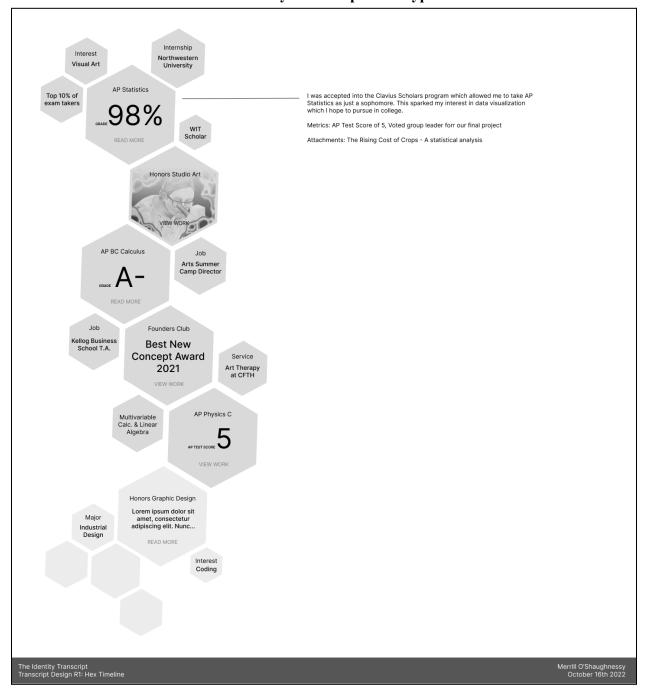
Appendix A
Preliminary Transcript Prototypes

Interest
Visual Art

Internship
Northwestern
University

Top 10% of
exam takers

AP Statistics

GRADE **98%**

READ MORE

WIT
Scholar

I was accepted into the Clavius Scholars program which allowed me to take AP Statistics as just a sophomore. This sparked my interest in data visualization which I hope to pursue in college.

Metrics: AP Test Score of 5, Voted group leader forr our final project

Attachments: The Rising Cost of Crops - A statistical analysis

Honors Studio Art

VIEW WORK

AP BC Calculus

GRADE **A-**

READ MORE

Job
Arts Summer
Camp Director

Job
Kellog Business
School T.A.

Founders Club
**Best New
Concept Award
2021**

VIEW WORK

Service
Art Therapy
at CFTH

Multivariable
Calc. & Linear
Algebra

AP Physics C

AP TEST SCORE **5**

VIEW WORK

Honors Graphic Design
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc...

READ MORE

Major
Industrial
Design

Interest
Coding

The Identity Transcript
Transcript Design R1: Hex Timeline

Merrill O'Shaughnessy
October 16th 2022

Figure A1. An early transcript prototype where a visual timeline of accomplishments is used to represent a student's academic performance in high school
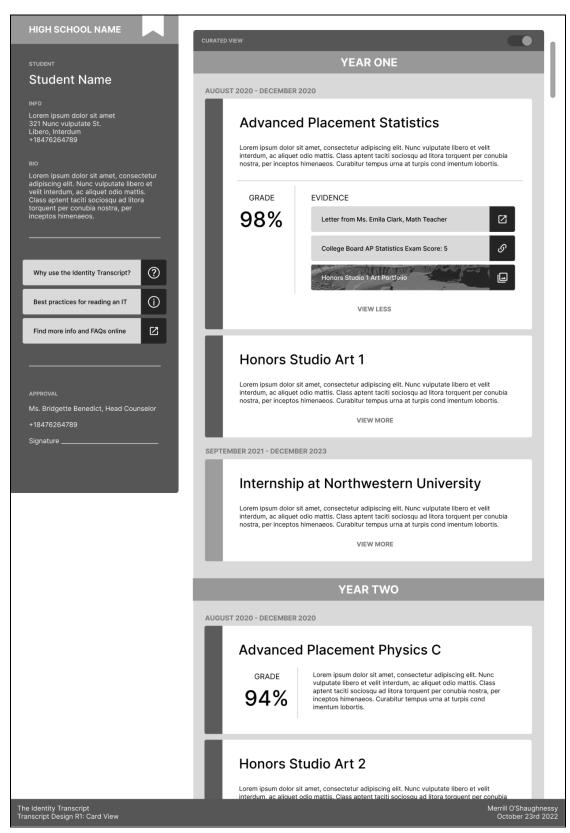
Figure A2. An early transcript prototype where a collection of cards ordered by year provide details and evidence of a student's performance in classes and extracurriculars
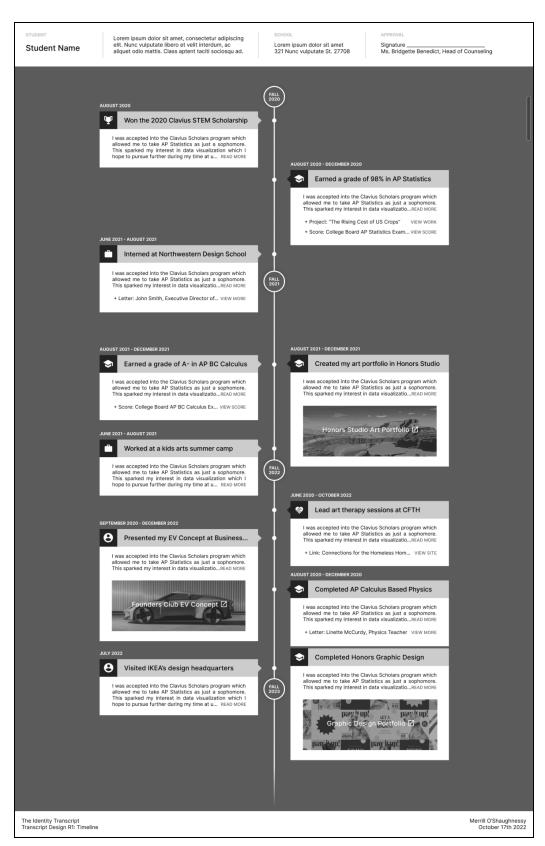
Figure A3. A medium-fidelity transcript prototype where a collection of cards attached to a timeline provide details and evidence of a student's performance in classes and extracurriculars
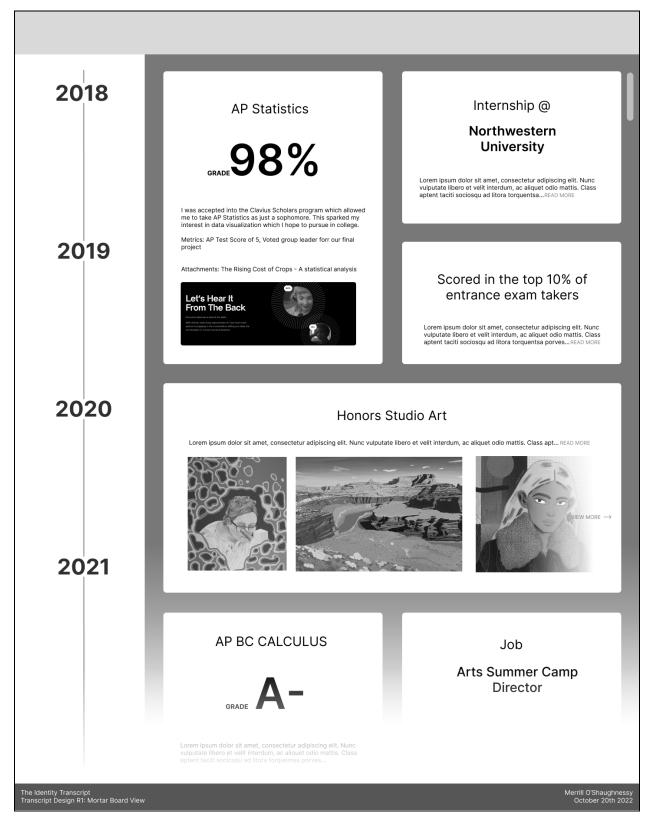
Figure A4. A low-fidelity transcript prototype where cards of varying sizes and ratios organized in a compact mortarboard format provide details and evidence of a student's performance

Figure A5. A medium-fidelity transcript prototype that includes a Gannt chart of a student's courses and extracurriculars
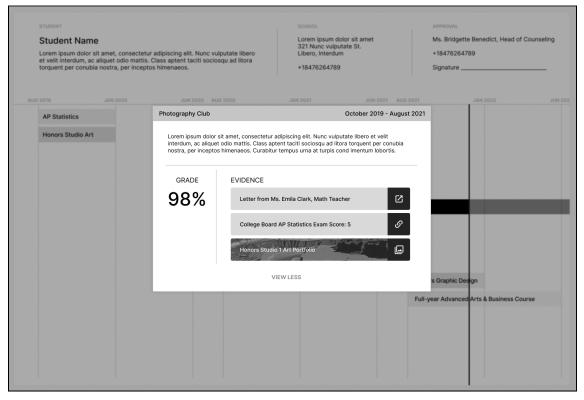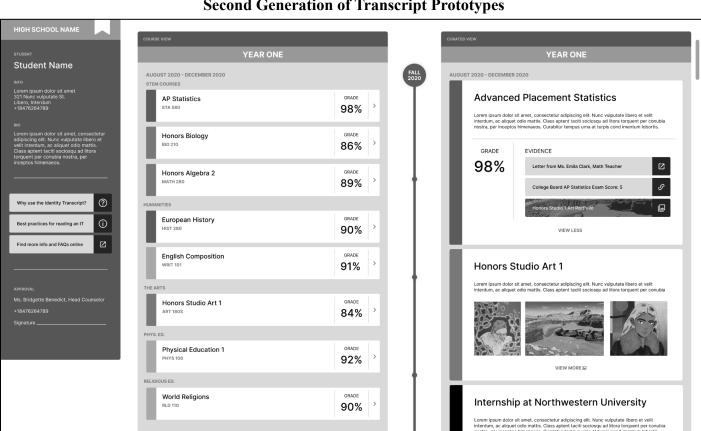

Figure A6. A second view of the prototype shown in Fig. A5 where an item on the Gannt chart has been selected revealing details and evidence of the student's activities

Appendix B
Second Generation of Transcript Prototypes

Figure B1. A second-generation prototype that combines a traditional transcript view, a vertical timeline as shown in Fig. A3, and a card view as shown in Fig. A2
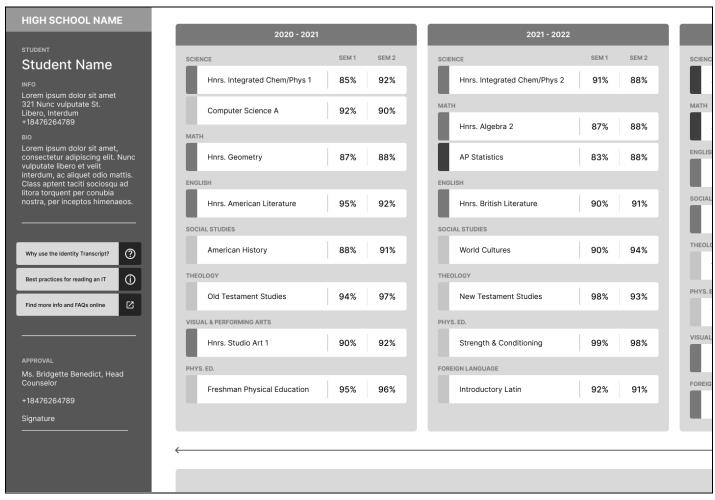
Figure B2. A second-generation prototype that combines a similar traditional transcript as shown in Fig. B1, a horizontal timeline, and (not shown) a Gannt chart as depicted in Figs. A5 and A6