

# iStudy: Pioneering Blockchain-Enabled Learning Management System in Education

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As years have gone by, many things around us have evolved, and improved. Cars have become faster, safer, and more efficient. Google is pioneering self-driving cars and Oracle is implementing “self-driving” databases. Space moonshots and travel have reached amazing new heights, and the idea of colonizing another planet is becoming more viable each day. Information has become more accessible to a diverse group of people around the world, and we can communicate to broader audiences more than ever before. If everything around us has developed and evolved in such significant ways, why is it that our educational system still caters to such a small spectrum of learning styles? Perhaps, it is time to create a system that allows for long term action by using nudges which provide alternative courses of actions, yet conserve freedom of choice (Thaler and Sunstein, 2014).

In order to evolve our educational system, we must take steps to expand the ways we learn, helping us cater towards all learning styles. One thing that has been implemented into many schools is an online content management system, which allows teachers to post assignments and grades online for students to check at anytime. This is a step in the right direction in accomplishing a moonshot in education and we still have a lot of untapped potential in most of these systems (Esther Wojcicki, 2017).

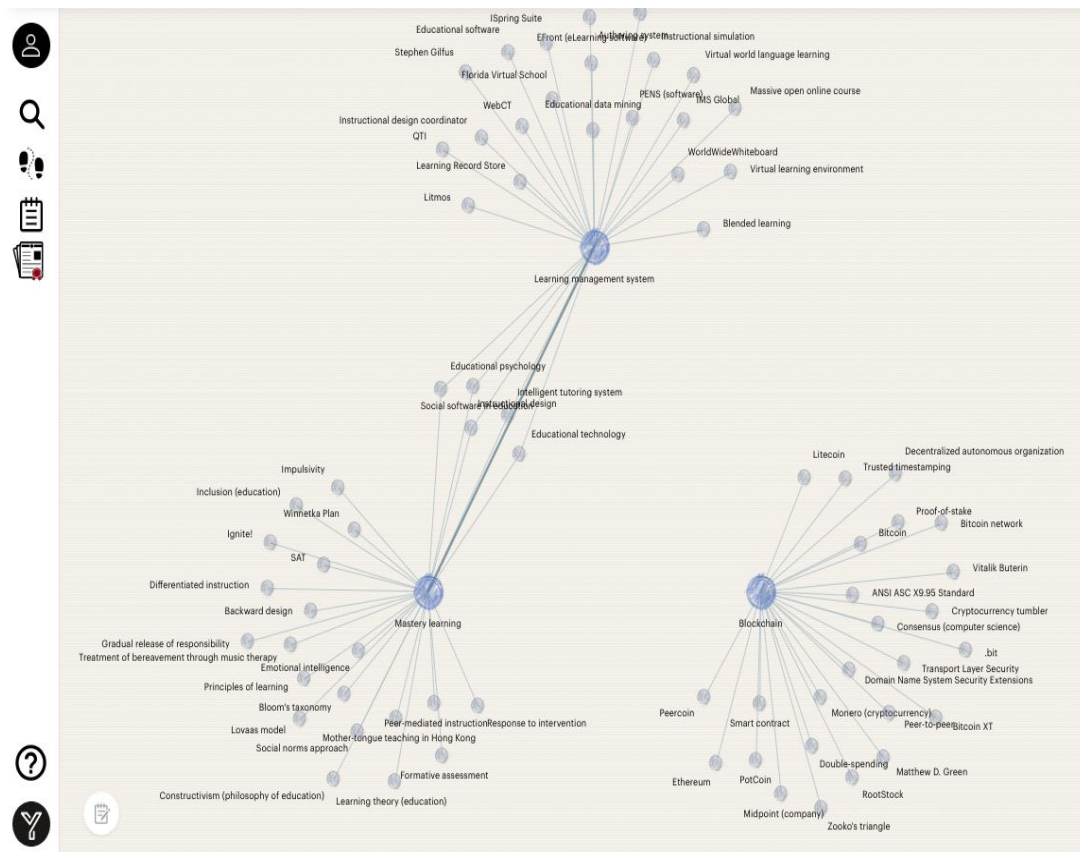
The proposed moonshot solution is a revolutionary student designed platform called iStudy, a mastery learning management system currently in beta testing at Design Tech High School@ Oracle (Barbosa, Blessinger, Dvorkin, Howard et al.,2018). This platform has integrated the artificial intelligence concept visualization research tool, Yewno Create as well as the ethereum blockchain cryptocurrency called EduCoin to incentivize learning (Carty & Haart, 2018). The Educoin gives students a powerful **incentive** to learn and engage with each other while earning currency they can use to invest in more learning. Students will be able to participate in the education market economy and earn ethereum cryptocurrency through a variety of ways that enhance their learning. In iStudy, the Educoin will be attached to mastery and competency badges that students can earn on reaching mastery at specific milestones using smart contracts. The cryptocurrency, EduCoin will thus promote students to enjoy learning through personalized parameters the teacher and students agree on (Punctuality, behavior,

participation, etc.). A platform like iStudy should be an enjoyable experience for both students and teachers, and promote communication between both groups while also providing a way to assess and track for mastery. Integrating artificial intelligence, augmenting technologies, machine learning and blockchain technology in the content creation, management and delivery system is revolutionary and a vital step in designing a classroom of the future. iStudy is an initial attempt to create a truly student centered system for school districts like Palo Alto Unified, and seems to be a vital first step towards accelerating the current educational system to be aligned to current needs and wants.

To date, no learning management system exists that is integrated with any blockchain (See Yewno Knowledge Map in Figure 1).

**Figure 1: Yewno Create Knowledge Map**

To date, no connection exists between Learning Management System and blockchain. iStudy becomes the first LMS that uses the Ethereum Smart Contract to incentivize learning delivery, management and content creation



The iStudy platform has futuristic features that makes competency based learning, especially online learning, more collaborative, interactive, and personalized. Although iStudy may seem similar to other content management systems, it is the first learning management system that has leveraged smart contracts fundamental to the robust ethereum blockchain system. Some exciting features that will increase student engagement in iStudy in the future will include integrating livestream capability such as youtube live. This will make it possible for students to fully participate and engage authentically with curriculum being delivered from anywhere in the world. A VOIP system is also being developed to provide a robust system that is responsive to students who benefit from this technology. VOIP will allow anyone in the class to join voice channels, and collaborate with each other regardless of location which will allow policy makers and stakeholders to implement equitable programs.

Istudy is also the first decentralized student designed and developed learning platform that has integrated the artificial intelligence research engine, Yewno Create; a powerful search engine that intuitively accelerates student understanding of their research journey. Students can easily search for a term within iStudy and a knowledge map is generated with related concepts dramatically increasing a students self-efficacy in conducting deep research, ultimately resulting in deep learning. Yewno Create also has integrated the Open Journal System (OJS) to provide ease of access for high school students to publish their work and share it with the world. iStudy consequently guides students to easily document their research journeys, go through peer review and ultimately get published in scholarly journals such as those in the Designership Institute Press at Stanford. This levels the playing field for **all** students to be provided an opportunity to be published in a peer review journal. Publication in a scholarly journal not only results in a significant EduCoin reward, but is also a measure of a students' intellectual vitality and curiosity. To date, it is still challenging for pre-collegiate students and faculty to get their work published in recognized peer review journals such as the Designership Press. However, with the release of iStudy and the rise of the crypto market, the ease of publication afforded by the Open Journal System, Yewno Create addresses the technology gap that currently exists in the education space. In fact, Create paves the way for junior and high school teachers to now support all their students to reach their creative potential and nurture their intellectual vitality.

### **Design Constraints to Implementing iStudy**

The primary challenge any educational institution, district or program may have is finding an incentive to switch from their already adopted content management systems dominated by major players such as powerschool, schoolloop, canvas and infinite campus. Specifically, proponents of maintaining the status quo might argue against the burden that data migration might demand whenever a new LMS system gets adopted. While there will be an initial learning curve each time a new system like iStudy is adopted, it is noted that most school districts have gone through multiple systems already and none of them are changing as fast as the technological innovations that we are currently experiencing. The challenge that iStudy faces is familiarity as it is a new technology that is designed to continue evolving based on student and teacher feedback. The platform must overcome status quo bias and there has been success in seeing that students and teachers at Design Tech High School who adopted iStudy found it to be a better system than what the school currently has. While some of the stakeholders argued that it wouldn't make sense for a school program to use multiple systems, this was expected from Thaler's behavioral economics perspective. From the student perspective, Thaler's "endowment effect" is seen in that students felt like they owned iStudy because they have been integral in the design and development of the system. Therefore, students and teachers who encouraged student creative confidence in designing the platform seemed to put much value on the efficacy of the system.

On the other hand, stakeholders who were not directly involved in the design and development of this platform placed a lower value. However, since the platform was easily available, they allowed teachers to opt-in to use iStudy or Google Classroom, but ultimately report progress on Power Teacher. This availability heuristic made it easier for all users to feel engaged in the design of a system that is geared towards extreme personalization. Design Tech High School's vision of excellent learning made the iStudy prototype something the school loved in that iStudy painted a picture of the type of learning experience that the school wanted for all the students. This vision was crafted by school leaders, teachers, and students and incorporated both "what" d.tech wanted students to master as well as "how" d.tech wanted students to master those concepts and skills, with a focus on building foundational content knowledge based on current state standards, postsecondary education preparedness, and personalized instruction which facilitated different supports and pathways towards academic and professional success. The Learning Engineer's Competencies that the school adopted also described the function of teachers or "learning engineers" in this process.

Considering the low pace that public education is known to take, it might be a few months and possibly years before responsive learning management and delivery systems like iStudy are mainstream. However, from a behavioral economic perspective, the ease of access of iStudy for both students and teachers will likely result in steady growth of adaptation and ultimately creating a new reality.

In this behavioral economics research, I looked at the current systems adopted by our school district, the Palo Alto Unified School District. In interviewing students and staff, one concern that they had was that a new system could be considered a waste of money and the board will likely not consider something that is designed by students. Being cognizant of the social and political factors that the district has to deal with in its effort to offer a truly personalized education, it is surprising that currently, Gunn High School uses two learning management systems, schoology and infinite campus. The reason for using these two systems is unclear, however, it looks like infinite campus is being used for attendance and transcripts and schoology for content delivery and management system. Developing a system that has positive attributes of infinite campus and schoology will lower costs and increase efficiency. It will also make it easier on both students teachers, and the administration, as all their data is centralized on one system, iStudy will do that.

Existing systems such as infinite campus and schoology can be incredibly tedious for both teachers and students as these systems are not responsive to the student needs. The highly responsive nature of iStudy is an incentive, both in the short and long run for districts and educators to switch to something that is customizable to all stakeholders. The **factors of production** for the proposed iStudy system aren't as costly and districts such as ours will be pioneering if we move away from using these closed systems that perpetuate the one size fits all factory model. In terms of **land**, all that will be required is a small space to host a server or servers depending on the size of the institution. Most districts like ours already have an existing information technology team responsible for managing multiple learning management server systems. There will be no additional infrastructure needed to adopt a more efficient system, a major economic incentive for a large school district such as PAUSD. An office isn't even necessary, as most of the communication can be done virtually and even remotely.

**Labor** will mostly consist of having people who are trained to regularly maintain and update servers and this is something that can mostly be done remotely. For a district such as Palo Alto Unified School District, many employees have different skill sets and the number of technologists that will need to be onsite can be reduced if there is one comprehensive content

delivery and management system. iStudy will require programmers for site functionality and customization based on the needs of each individual district, school or teacher. It will also require graphic designers for the site Graphical User Interface (GUI) and logos. It also requires a system administrator for each school, who will be in charge of maintaining the physical server itself. Often times, the system administrator requires direct access to the physical server, and it is most convenient if they are located nearby. Without investing in technical **labor**, iStudy can never be realized, as all **production** is done through people with the skills to program and manage servers.

Another large **factor of production** for iStudy is the financial and social **capital** required to implement it in school districts. Many of the technologies used to either create or test iStudy can be expensive if it is truly going to be a responsive system. The main capital will go towards computers for programmers as well as technologists who manage the server infrastructure. Servers, along with a building (or rented space within a building) to house these servers are also a capital investment to consider. Developing and building the website in order to make it robust against malware and secure. An SSL certificate is required and is often purchased along with the domain name for new programs and might not be necessary for established programs such as PAUSD, which is an important part of branding a website or platform (social capital).

Although it is a significant shift from more familiar learning management systems, switching to iStudy can have many advantages for all stakeholders as it is both a content management, content creation and content delivery system. It promotes collaboration between students through the integrated Yewno Create collaboration and the instant messaging feature, allowing students and teachers to easily communicate in real time or access a VOIP virtual classroom, allowing them to collaborate within their class from anywhere on the planet.

With the implementation of the EduCoin, iStudy gives learning a new **incentive** as well. Students will be able to earn the ethereum cryptocurrency by doing their work, as well as engaging with and helping others throughout the platform. There are class badges that students can earn, which also reward them with EduCoin, promoting them to be better students through whatever parameters the teacher would like to set on these badges (Punctuality, behavior, participation, etc.). A platform like iStudy should be an enjoyable experience for both students and teachers, and promote communication between both groups. This is what iStudy is aiming to be, and is a vital first step into the classroom of the future.

## **References**

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