

Communication Technologies: The Potential of Indoor Positioning Analytics

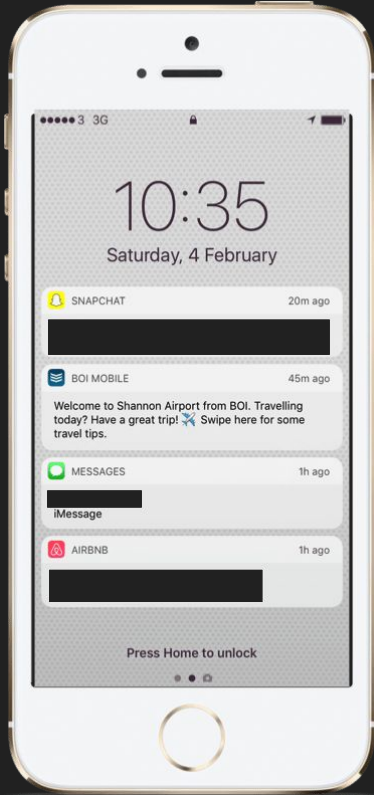
An aerial night view of a city with a network of location pins and connecting lines overlaid on the image. The pins are white with a circular glow, and the lines are thin white lines connecting the pins. The city lights are visible in the background, and a prominent light trail from a road or highway is visible in the lower right quadrant.

By: Greg Patton

Introduction

For my final assignment, I wanted to examine a more theoretical development in education than a firm, concrete one. As we move farther away from traditional “stand and deliver” classrooms and towards inquiry-based, facilitated learning, it is inevitable that the technology used in the classroom will also transform. Handheld devices, almost ubiquitous now in most high schools, could be on the leading edge of this transformation. This technology, bolstered by faster networks like 5G, will allow students to access more information and at a faster rate than ever before. Schools need to find a way to take advantage of this and use it for both their and the students’ benefit. I am going to look at an example of a technology that has the potential to do this: [Indoor Positioning Analytics](#).

Where Does The Software Come From?



This type of technology was first developed for the business world. As there is no company supplying this for educational purposes, I will examine a company that is a leader in Indoor Positioning Analytics and extrapolate on how their technology would benefit an educational setting.

The Company's name is [Inpixon](#).



Inpixon is a tech company based out of Palo Alto, California. Their IPA platform is designed to detect and position all active cellular, WIFI, and Bluetooth devices within a building while securing privacy and anonymity. <https://inpixon.com/inpixon-jibestream/>

“Inpixon Indoor Positioning Analytics (IPA) is the first indoor positioning solution and data analytics suite to deliver simultaneous locating, tracking and analysis for virtually any and every mobile device and asset—all from a single platform.”

<https://inpixon.com/wp-content/uploads/InpixonIPA-brochure.pdf>

With their acquisition of Jibestream, a Toronto-based firm focused on indoor mapping and location platform, Inpixon has developed a technology that is being used by:

- Governments
- Retail/Property Management
- Manufacturing
- Healthcare
- Corrections/Law Enforcement

inpixon Indoor Intelligence



JIBESTREAM

An Inpixon Company



The three main aspects to this technology that show potential in respects to Literacy and Education are:

- Indoor Navigation
- Geofencing
- Proximity Messaging

Defining Some Terms

A **Geofence** is, “A virtual geographic boundary, defined by GPS or RFID technology, that enables software to trigger a response when a mobile device enters or leaves a particular area.” <https://www.lexico.com/definition/geofence>

Proximity Marketing (Messaging) is, “the localized wireless distribution of advertising content associated with a particular place. Transmissions can be received by individuals in that location who wish to receive them and have the necessary equipment to do so.” https://en.wikipedia.org/wiki/Proximity_marketing

Indoor Navigation is, “ the flexible guidance of people in confusing, unknown buildings and building complexes.”

<https://www.favendo.com/wayfinding/what-is-indoor-navigation>

Geofencing



“Use geofences to create a virtual perimeter on a map and target users that cross this virtual boundary. Geofences can be any shape or size and can be set up to trigger alerts or targeted messages when a user enters, exits or dwells within the predefined area.” <https://www.jibestream.com/use-cases/geofencing>

Educational Potential

A **geofence** could be put around an area as broad as an entire school site, or as narrow as a particular classroom. A geofence around the school would allow administration to know who has entered, or exited, the building and at what time this occurred.



Educational Potential



Geofenced classrooms would automatically take attendance as students entered the room, giving teachers back five to ten minutes of instructional time at the beginning of the class.

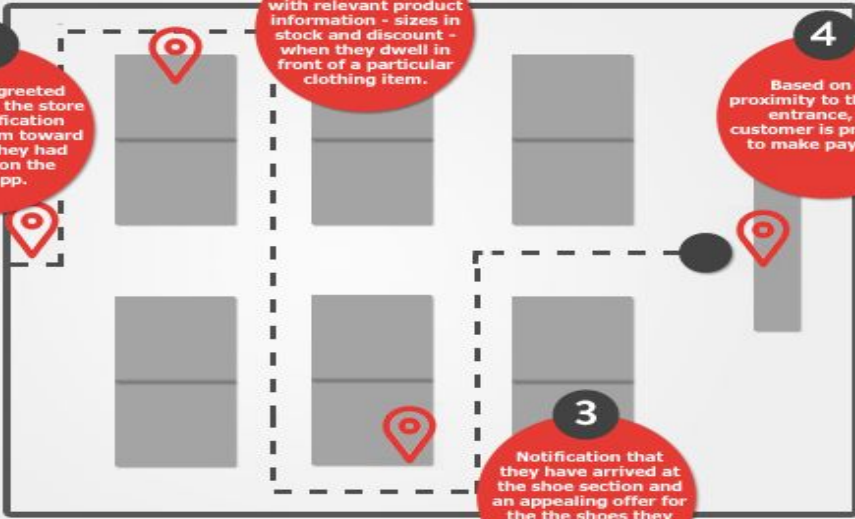
Educational Potential

A geofence could also be established around an area where access to the network would be blocked; thus making sure that students' attention is directed away from their devices. An assembly in an auditorium with a keynote speaker would be an apt example of this.





1
Consumer greeted as they enter the store with a notification directing them toward the shoes they had looked at on the store app.



2
Consumer engaged with relevant product information - sizes in stock and discount - when they dwell in front of a particular clothing item.

4
Based on the proximity to the till or entrance, the customer is prompted to make payment.

3
Notification that they have arrived at the shoe section and an appealing offer for the shoes they are interested in purchasing.



Proximity Messaging

“Trigger messages and build a library of data around the proximity of assets, users and locations. ... (U)se this data to deliver hyperlocal content in real-time based on destinations and points of interest around them, such as nearby stores, coffee shops or other relevant spaces.” <https://www.jibestream.com/use-cases/proximity-messaging>

Educational Potential

Once a geofence has been triggered, **proximity messages** could be sent to staff and students. Students would receive messages pushed to their device like announcements, student's updated daily schedule with changes, overdue library book notifications, after school/lunch club meetings for that day, athletics schedule, cafeteria menu, and student's appointments with counsellor/administration/youth care worker.

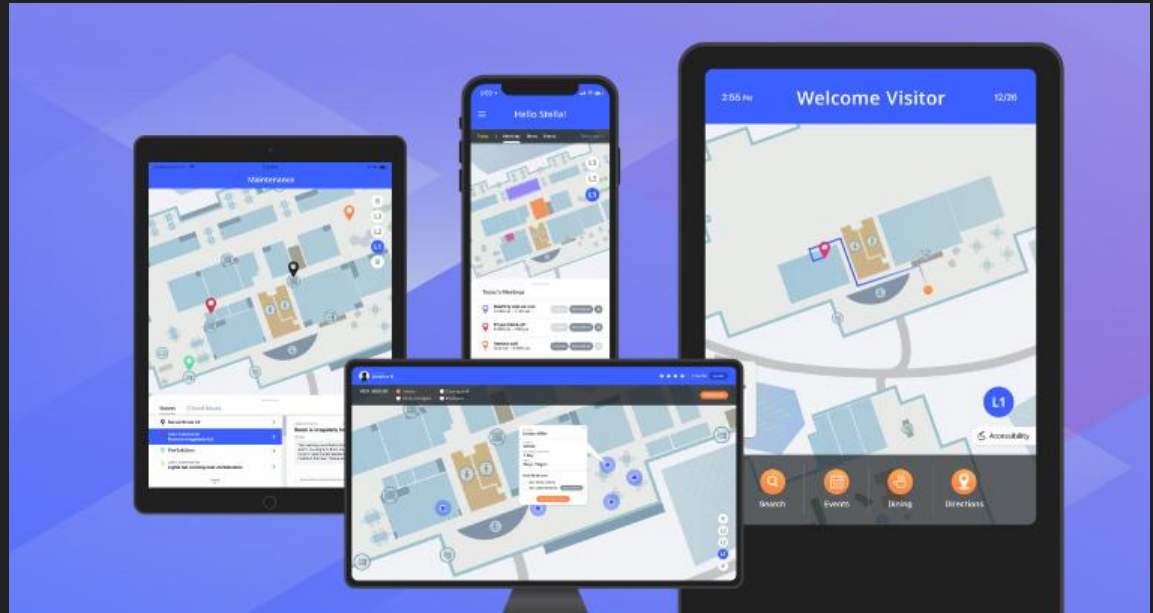


Educational Potential

Teachers could also push out assignments, both past and future, and information for class, like videos or articles that could be reviewed at any time. This would free up more instructional time in the classroom.



Indoor Navigation



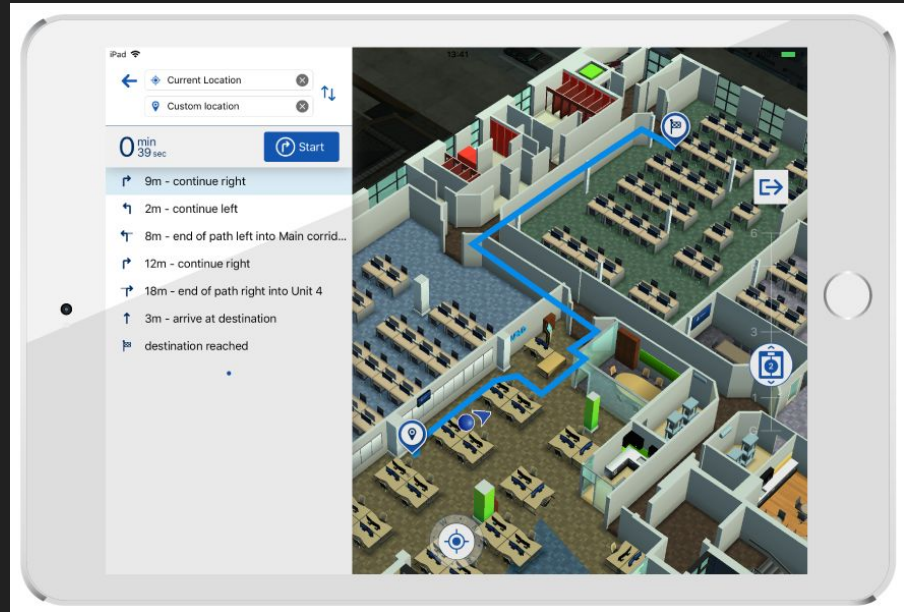
“Our indoor mapping platform empowers users to navigate between two waypoints on a map or to a particular destination. Our wayfinding algorithm uses speed, weight, and accessibility parameters, along with distance, to generate an optimal travel path.” <https://www.jibestream.com/use-cases/indoor-navigation>

Educational Potential

Indoor Navigation would give every student and staff member access to a virtual map of the school and their position within the building. Individuals would put in the room they are looking for and the app would then give them directions.



Educational Potential



This function could also be paired with [proximity messaging](#), so that if there is a sudden classroom change, or a class was meeting in the library, a notification could be pushed to individuals in the class with this information and a navigation route.

Why This Change?

“If it were possible to define generally the mission of education, one could say that its fundamental purpose is to ensure that all students benefit from learning in ways that allow them to fully participate in public, community, and economic life.” [The New London Group. \(1996\).](#)



This diagram of a smartphone shows the potential it has to be a vital instrument in the New London Group’s vision of the mission of education.

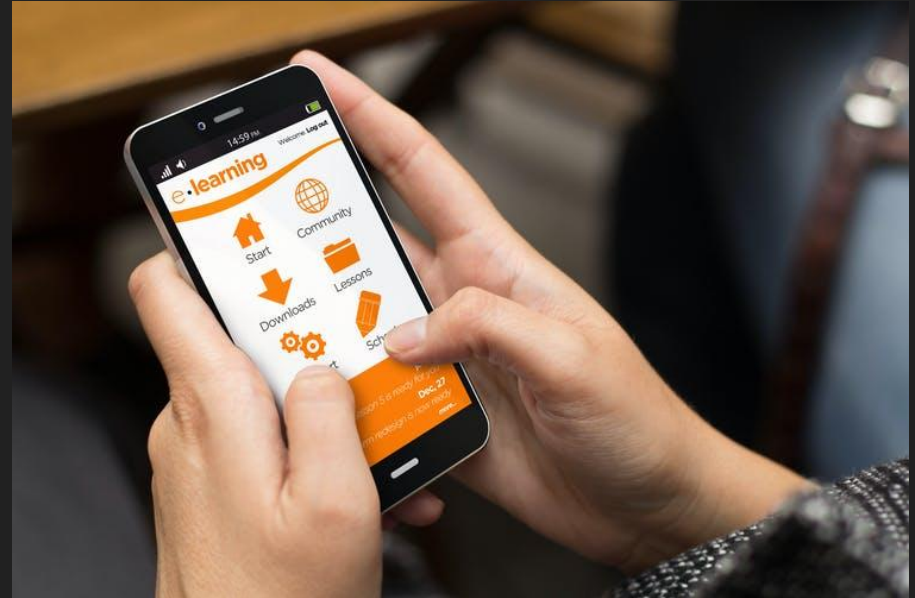
Why This Change?

By allowing the free flow of text materials, be it written assignments, podcasts, videos, and potentially VR lessons, teachers can start to transform their classroom. They become facilitators of learning, helping students with what they have processed and how it relates to the subject matter, rather than lecturers that then reinforce their with handouts.

Also, by being multi-modal, teachers are individualizing the curriculum for their class; students can choose how they receive their content. They can also suggest other materials that may be pertinent to the subject matters by pushing them back to the teacher; thus making the learning a partnership between facilitator and learner instead of the one way model of teacher and student.

A Scenario

A student comes in the school in the morning, triggering a geofence, and has the cafeteria menu with online ordering options, the morning announcement video by the AV club, a podcast for Science class, a Kahoot quiz for English, a Word doc of the rules and regulations of Volleyball for PE, and a reminder to attend robotics club after school pushed to their phone.



A Scenario



The student chooses to do the Kahoot first, showing that they have mastered that material, so they send their teacher a voice-to-text relaying they do not need to attend class today. The student then listens to the podcast and decides they want to meet with their Science teacher and talk through some of the concepts, so they go to class.

A Scenario

After they pick up their pre-ordered lunch, they listen to the Word doc through the Text-to Speech option while eating. A notification comes in saying that PE will be meeting in their classroom instead of the gymnasium and a pin appears on their indoor map, showing them where to go.



A Scenario



Halfway through the PE block, another notification comes through saying that robotics club is cancelled as the sponsor teacher is not available after school anymore. As they leave the building, they push all their homework to their teachers and a request for an appointment with their counsellor.

Final Thoughts

Though Inpixon is not currently using their platform in an educational setting, this technology could transfer into school buildings and have the potential to be a “game changer” when it comes to how schools run. There are a plethora of privacy and security questions, not to mention numerous parental concerns, that a school district would need to answer before delving into a platform like this. There is also the aspect of the “digital divide” in schools which would become even more apparent with the implementation of this software; especially if 5G technology is also used. But as our educational worlds all change towards a larger online presence, is technology like this that far off from being in our schools?

References

Favendo. (2021). *Indoor Navigation and its Possibilities: Your Benefits*. Retrieved from <https://www.favendo.com/wayfinding/what-is-indoor-navigation>

Inpixon. (2021). *Indoor Positioning Systems & RTLS (Indoor GPS)*. Retrieved from <https://inpixon.com/wp-content/uploads/InpixonIPA-brochure.pdf>

Inpixon. (2021). *Indoor Proximity Messaging, Marketing & Services*. Retrieved from <https://www.jibestream.com/use-cases/proximity-messaging>

Inpixon. (2021). *Inpixon's Acquisition of Jibestream Inc. - FAQ*. Retrieved from <https://inpixon.com/inpixon-jibestream/>

Jibestream. (2021). *Indoor Geofencing & Location-Based Services*. Retrieved from <https://www.jibestream.com/use-cases/geofencing>

References

Jibestream. (2021). *Indoor Navigation & Wayfinding Systems*. Retrieved from

<https://www.jibestream.com/use-cases/indoor-navigation>

Lexico. (2021). *GEOFENCE | Definition of GEOFENCE by Oxford Dictionary on Lexico.com also meaning of GEOFENCE*. Retrieved from <https://www.lexico.com/definition/geofence>

The New London Group. (1996). [A pedagogy of multiliteracies: Designing social futures. \(Links to an external site.\)](#)

Harvard Educational Review 66(1), 60-92.

Wikipedia. (2021). *Proximity marketing*. Retrieved from https://en.wikipedia.org/wiki/Proximity_marketing