

Big Data in Healthcare

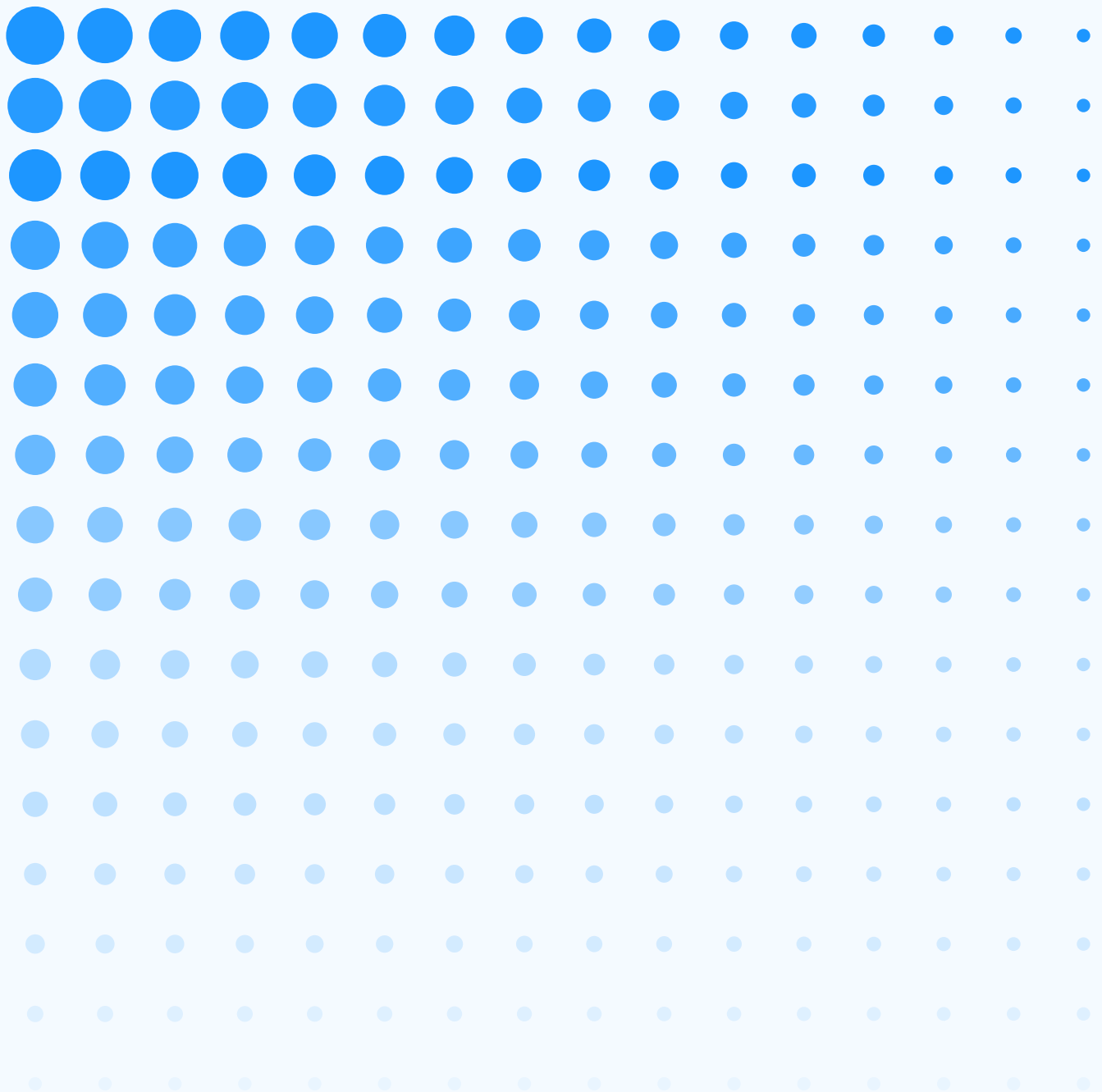
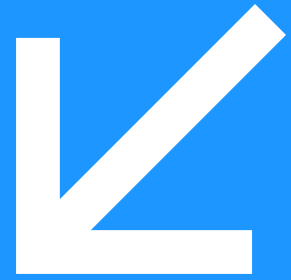


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INTRODUCTION

The healthcare industry is changing profoundly. As medical technology advances, hospitals are beginning to rely on Big Data to make better decisions about patient care.

It is a reality that digitization has been embraced by various sectors, such as telecom, banking, pharmaceuticals, healthcare, FinTech, EdTech, and other industries. However, due to the importance of patient data and information, managing and utilizing data in the healthcare sector carries a unique set of challenges.

The usage of big data in healthcare is the key to ensuring that patients receive appropriate treatment and care while also reducing costs across the health system. Big Data can help identify gaps in care and provide insight into patient outcomes. This will enable better decision-making by medical professionals and allow them to allocate resources more effectively than ever before with less waste or duplication of effort.

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THE IMPORTANCE OF BIG DATA

Big Data is having a profound effect on how businesses and sectors maximize solutions for customers and patients. According to [Stefan Stroe](#), the global big data analytics sector is estimated to reach \$68 billion by 2024.

That makes data analytics one of the fastest-growing industries worldwide. But why is that? Is data truly that advantageous for businesses? Here are three fundamental reasons that BigData is positively impacting businesses on a global scale.

1 COST REDUCTION

Understanding data is proven to reduce costs drastically. Data can help reduce costs for businesses because it provides a greater understanding of how resources and human capital are used. Using metrics and analyzing trends through past behavior

is a great way to understand better and streamline your business. This leads to cost reductions both because of improved efficiency and because it can enhance the decision-making processes for employees who can make more informed decisions.

2 FASTER, BETTER DECISION MAKING

Faster, better decision-making is one of the essential advantages to Big Data. Data allows businesses and employees to make decisions based on real, factual information rather than gut feelings or intuition. Making business decisions based on numbers and facts can streamline the process as it minimizes human error and the influence of personal feelings.



3 NEW PRODUCTS AND SERVICES

Creating new products or services can be difficult for businesses, but data collection and analysis are great ways to discover what people are looking for. By using information gathered from social media posts, surveys, sales numbers, etc., it's possible to understand your customers' needs better.

This will allow you to create quality products that meet those needs based on market trends rather than guesswork. Before launching a new product, understanding the data and metrics can save companies millions of dollars and mitigate risks.

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THE DATA OVERLOAD

In the healthcare sector, there are staggering amounts of data collected daily.

According to [Statistica](#), there was an estimated 2,314 exabytes of new data generated in 2020. With the enormous amounts of data collected and the growing demand for it, there needs to be a way of managing this information.

The sheer volume of collected information is staggering when you consider that every patient who steps foot into a hospital brings their own story with them. Most people have no idea just how much information they are carrying around. Even something as seemingly trivial or benign as an individual's gait can tell medical professionals about issues with blood flow, heart problems, bone density, etc.

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THE FUTURE OF DATA IN HEALTHCARE

With AI and innovative technology, the future of Big Data in healthcare looks bright.

The technology can assist professionals with research and treatment by providing them with a better understanding of their patient's conditions. This will allow medical staff to provide more personalized care as they identify trends that may not be readily apparent at first glances, like how certain diseases or illnesses tend to run in families.

Using AI-driven technologies for data analysis has huge benefits for doctors because it allows them to find connections between various pieces of information which would otherwise go unnoticed due to human error or bias when assessing multiple cases simultaneously. Plus, using big data analytics is less expensive than hiring additional personnel who would need extensive training on all types of different equipment used within hospitals today. While the possibilities for the future of data-driven healthcare are endless, here are a few key areas that are primed to benefit from data-driven analytics.



1 PRECISION MEDICINE

By understanding more about how genes work, researchers can create treatments that are specific to the patient. Before this technology, treatments were based on what had worked for most people, not necessarily taking into account an individual's unique genetic makeup.

2 POPULATION HEALTH MANAGEMENT

Big data analysis can help identify gaps in care across a population of patients. This allows medical professionals better treat conditions and illnesses before they escalate into something serious or life-threatening.

3 REMOTE MONITORING

Through sensors and monitoring devices, it health at home. This can make a world of difference for people living with chronic or acute conditions.

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THE DIFFERENT DATA TYPES IN HEALTHCARE

In the healthcare sector, many different types of data points are collected. Here are some of the main categories for data collection.

1 ELECTRONIC HEALTH RECORDS (EHR)

Electronic health records (EHRs for short) contain patient information such as medical history, current medications, allergies, and more. EHRs are extremely valuable for healthcare professionals because they give the best possible treatment to keep patients healthy and alive. Information from these documents can also be vital during legal proceedings or insurance claims.

2 ADMINISTRATIVE DATA

Administrative data is a broad category of information that includes demographics, vital signs, laboratory results, and more. Administrative data have been used within the healthcare industry to gain valuable insights into economic trends or disease management.

3 PATIENT-REPORTED OUTCOMES (PROS)

Patient-reported outcomes are essentially how patients feel on a day-to-day basis. For example, if an individual comes in with back pain, you might ask them questions like, "On a scale from one to 10, how would you rate your pain?" These answers will give medical professionals insight into what treatments should be taken first without relying on trial and error methods, which could make patient care worse rather than better over time.



4 INSURANCE CLAIMS DATA

Insurance claims data is another broad category of information that includes the price of medical procedures, diagnoses, and more. Organizations have used this data to

analyze trends in healthcare spending, which helps them plan for future economic growth or identify new areas where they could save money through cost reduction efforts.

5 PATIENT SURVEYS

Patient surveys are a great way to get information from the patient directly. Surveys can gain insights into how patients feel about their care or what they would like changed within the system. Using patient surveys can be a great way to get frontline input into how healthcare organizations are doing.

All of the data types listed above have been used to gain valuable insights within the healthcare industry. Still, Big Data analytics can be used to take these efforts even further by allowing medical professionals and researchers alike to make sense out of all this information at once rather than one type at a time. Applying advanced software solutions designed for big data analysis and human expertise makes it possible to identify trends in inpatient care and economic factors that could lead to significant improvements across an entire health system or country over time.

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THE ADVANTAGES OF UNDERSTANDING DATA FOR HEALTHCARE

While there are many data points and areas in which data is collected, having all the data in the world is of no use if it cannot be analyzed appropriately. Here are the main advantages to storing and accessing data in the healthcare sector.

1 BIG DATA IN BIOMEDICAL RESEARCH

Biomedical research can often take years, even decades, before it begins to be realized in the medical community. However, when researchers can use big data analytics on biomedical datasets that have already been collected and stored, they can learn more about diseases or other vital issues within just a few months. In contrast, it can take doctors years to figure out what is wrong with an individual patient without data.

2 MEDICAL DISCOVERY

One of the biggest challenges healthcare providers face today is finding better ways of preventing disease while also improving treatments for existing conditions. These two areas are where most cost reduction efforts will come from since they allow doctors and patients alike to keep people healthier overall, which means shorter stays at hospitals, less expensive procedures over time, and so on.



3 CUSTOMIZED PATIENT EXPERIENCE

Patients often tell healthcare providers that they want more personalized care. The only way we will deliver this kind of experience is by having a deeper understanding of individual patient data. By using big data analytics, hospitals can develop treatment plans that are better suited for each patient,

leading to better health outcomes and happier patients over time. Each time a customer comes in to visit, having a proper system will allow the doctor to understand better the patient's condition and what they need going forward.

4 IMPROVES PATIENT HEALTHCARE EXPERIENCE

When healthcare providers have a deep understanding of their patients and everything going on with them over time, they can deliver the best possible patient experience. If you want to attract more people into your system or retain existing customers, this will be one key area where big data analytics come in handy. It's easier to build an emotional connection with those receiving care from you when both parties know each other on a deeper level over time.

5 PREDICTS PATIENTS AT HIGHER RISK EFFICIENTLY

Another significant aspect of big data in healthcare is being able to foresee or predict trends in patient populations based on their risk factors or other conditions, which could lead to a significant health issue in the future.

While it's impossible to predict everything that will happen with every patient, you can better identify those at higher risks overall and then proceed accordingly by getting them into treatment more quickly while also working harder on prevention methods over time.

6 IMPROVES PATIENT OUTCOMES OVER TIME

Having access to all kinds of healthcare data from your practice, hospital, etc., it should be much easier for medical professionals to make changes when needed and improve results overall. Even if there isn't room for improvement today compared with where things were five years ago, big data analytics should allow us to get closer than ever before towards



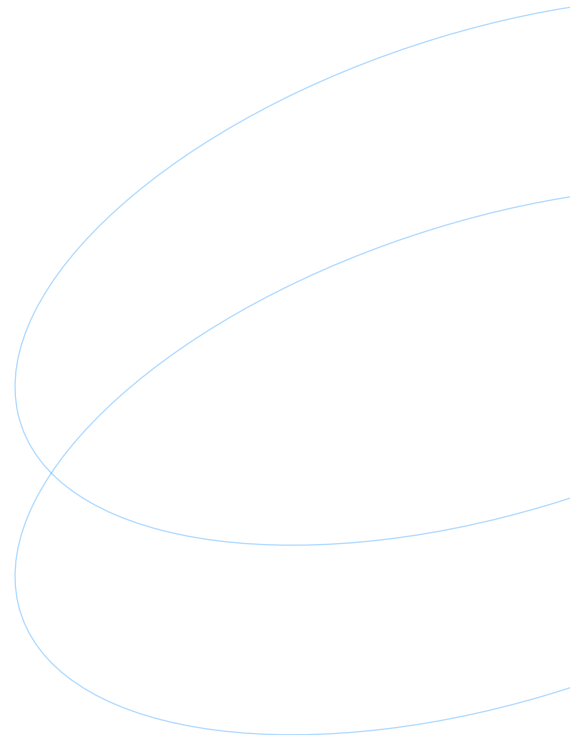
7 EASY PATIENT DIAGNOSTICS WITH EHRS

Electronic health records (EHRs) and other related technologies can generate mountains of patient data which is why it's essential to have the right tools in place that help you properly analyze this information. Instead of having doctors and nurses go through countless spreadsheets or files every day, they should be able to get all of their necessary work done quickly by working with big data analytics systems daily instead.

Having the numbers provide outcomes can minimize the risk of doctors or nurses missing something on the patient's medical files. When hospitals or clinics are busy, healthcare professionals do not have the time to analyze all the data correctly. Having the data follow them around in real-time via their smartphones or other devices is a great way to increase patient diagnosis accuracy.

8 REDUCES OVERALL HEALTHCARE COSTS

When healthcare professionals invest in big data for healthcare, this should help them save money over time. Investing in this sort of technology should streamline processes, increase efficiencies and improve cross-functional communication. Having a system that works properly will allow each party involved to get on track with helping people live healthier lives which means less expensive procedures and shorter stays at hospitals.



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CHALLENGES FACING E-LEARNING PLATFORMS

While the number of benefits associated with mass volumes of data collection in the healthcare sector is evident, there are many [challenges to overcome](#). Here are some of the most common issues that healthcare professionals face when dealing with big data.

1 LACK OF HEALTHCARE WORKERS WHO UNDERSTAND THE DATA

First and foremost, there is a lack of healthcare professionals who understand how to manage big data effectively. Healthcare workers are often in a high-stress and fast pace environment. When things are busy, it is hard for healthcare workers to find the time to interpret data. However, with a system that generates easy-to-read reports, big data can minimize patient analysis while

increasing accuracy. Training the staff is essential during the hiring process for big data analysis to be effective in a healthcare setting.

2 NAVIGATING DATA REGULATIONS

There are also the legalities around patient information access that need to be navigated for health systems to gather appropriate data without violating [HIPAA regulations](#).

Data collection is only permitted in certain circumstances, so healthcare professionals need to know exactly what they are allowed to do. The reason that the data has such tight regulations is the sensitive nature of the information. If a data breach were to occur or information fell into the wrong hands, there would possibly be significant legal ramifications.



3 IMPLEMENTING THE PROPER INFRASTRUCTURE TO HANDLE THE DATA

The majority of healthcare institutions do not have the proper infrastructure in place to handle all of the data that is being generated today. At many institutions, countless papers and files need to be managed daily, which is time-consuming. Suppose healthcare institutions want this information put into an electronic format. In that case, it will require

massive amounts of storage capacity and systems capable of processing big data analytics quickly enough for doctors and nurses to use during their shifts when they need immediate access. Not only will the software have to store high quantities of data, but it must be able to host data from multiple different locations and databases.

4 BEING ABLE TO INTERPRET LARGE AMOUNTS OF DATA

Once the data is securely stored in a central database, the next challenge for organizations is to make sense of this data and put it to use. A great platform that can be utilized is [Microsoft BI](#) or [Tableau](#). These systems can handle large amounts of data and turn it into readable information so that doctors, nurses, administrators, etc., can understand what they need to do to improve health outcomes for patients.

5 SAFELY STORING THE DATA AND PROTECTING CLIENT INFORMATION

With the sensitive nature of the data, healthcare professionals must take extra measures to ensure the data remains secure and confidential. Even with the best systems in place to handle this data and keep information safe, privacy concerns can lead to major legal problems for healthcare institutions without proper precautions. Patients need to know that their information will never fall into the wrong hands or get shared inappropriately because of a security breach. Because of this, healthcare professionals must implement encryption tools on top of any other forms of protection to reassure patients who provide sensitive personal medical records each day.

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THE IMPORTANCE OF DATA AND E-LEARNING

There are many ways in which you can secure big data. Here are some of the best ways to secure and utilize big data in the healthcare sector.

1 ALLOW PATIENTS ACCESS TO THEIR DATA THROUGH A PATIENT PORTAL

The first is by simply allowing patients to view their records online and access any information they want on a secure patient portal.

This allows patients to access their records whenever they want, which is great for the self-management of conditions and diseases.

It also creates an environment where there are multiple entry points for data collection so that data can be stored in a centralized location but still accessed by many different users who need it, like doctors, nurses, administrators, etc.



2 UTILIZE ENCRYPTION TOOLS, SUCH AS SFTP

Another method for keeping big data safe is through encryption tools, including passwords or other security measures that keep any information that does not belong on certain databases out completely.

Encryption systems are the best way to keep big data safe because they allow organizations to protect their valuable assets without impacting how that data can be used by staff members who need it on a day-to-

day basis. These processes should always be in place before any kind of sensitive information, particularly PHI (Protected Health Information) or PII (Personally Identifiable Information), gets collected and stored electronically to prevent breaches.

Using encryptions such as [SFTPs](#) before transferring any data is also the best way to protect any inbound or outbound data from your organization.

3 TRANSFER DATA USING AN ETL

Before transferring data from the collection point to the central database, and ETL must be used. An [ETL](#) is an Extract, Transform, and Load process used to get the information from one system to another.

An ETL can handle all of your data needs, such as getting specific sets of records or files into a central place without transferring any sensitive or personal information in plain text, which would leave it vulnerable.

In the healthcare sector, a [real-time ETL](#) may be of use as well. A real-time ETL can transfer information from one system of

record to another without using a batch process, which will ensure that sensitive information is never compromised during data transfers and storage procedures.

This type of technology also allows for more flexibility in terms of how records are transferred because it can handle all types of interactions within an organization or between organizations very easily, which makes life much easier when working with electronic medical records (EMRs) and other big data sets daily.

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USING INTEGRATE.IO IN THE HEALTHCARE SECTOR

One of the most important elements of big storage data is that the data is cleaned before reaching the central system.

For this reason, many organizations are starting to turn towards Integrate.io for their big data ETL needs because it is one of the most robust tools out there that can handle any load or transformation with an easy-to-use interface.

With Integrate.io, you will be able to transfer your information without the risk of compromise and in a way that makes sure, your PHI/PII is at minimal risk.

If you are interested in working with Integrate.io to streamline your Big Data needs, contact their team of experts today.

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CHALLENGES WITH TRANSITIONING TO NEW SOFTWARE

When choosing to transition to an e-learning platform, it's important to consider some of the challenges during implementation. Here are some notable challenges that may arise for your organization.

1 DATA MANAGEMENT

One of the most common issues that can arise when transitioning to new software is data management. This means that you'll need a process in place before the actual change occurs. Hence, everyone knows how they should handle any datasets created on your current platform, and don't forget about transferring it over later when making the switch.

2 SCALABILITY

Some data transfers can be extremely complicated, especially if you're working with really large datasets. Depending on the size of these datasets and how many employees will need to access them after transitioning over to your new e-learning platform, it may take some time for everyone involved to get acclimated before they start using it properly.



3 HAVING MULTIPLE DATA POINTS IN DIFFERENT LOCATIONS

Having multiple data points in different locations is one of the biggest challenges you'll face when creating an e-learning platform.

When it comes to this type of technology, there are many benefits for companies and institutions alike, which show why more people are making the switch worldwide. There's no shortage of big data problems or scalability issues within any industry,

so learning how to properly address these concerns will be something worth considering before transitioning your business/organization into new software entirely.

Using an ETL such as Integrate.io can be one way to ensure that everything is being handled properly while making the switch from your current e-learning platform.

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THE IMPORTANCE OF SECURE DATA TRANSFERS

Today organizations have millions of data points collected from various sources, which means that it is more important than ever to ensure proper security measures when transferring data.

One way you can make this possible for your company or institution, especially those who have been using LMS software and authoring tools and online courses provided by different platforms with sensitive information about clients or customers within the e-learning system at all times.

Using Secure File Transfer Protocols (SFTP) ensures that all files being transferred via an FTP server use strong encryption, so no one else has access unless they possess the decryption key.

This also helps avoid having any holes in terms of security since SFTP encryptions make sure everything is safe from prying eyes along every step of the process during.

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HOW INTEGRATE.IO CAN HELP WITH E-LEARNING

E-learning is a great way to train and educate employees in the digital age, but with all of these new technologies come challenges that can be difficult for companies and institutions which are used to working within certain parameters.

With a common issue of big data transfers and management, using Integrate.io to securely transfer data to and from data warehouses, databases and other data sources can help to ensure that your e-learning platform is a success.

Integrate.io will clean your data and allow you to transform it before loading it back into your target database or data warehouse.

This ensures that you have clean, high-quality datasets while also working with the same information across different platforms, whether an e-learning platform for employees/clients or authoring tools for creating online courses to distribute over the Internet.

If you are interested in optimizing your learning and training systems through an e-learning model, contact Integrate.io's team of experts today.