How Big Data & Data Analytics is useful in E-Learning

Imagine what we could learn if we put a tracker on everyone and everything (Jurdak, 2016)

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Big Data

E-learning could be the great asset that people could have a solution for some of their problems in the digital world. At least, they could promote skills to a lot of people who can be able to become competent in this field.
Big Data refers to the large amount of data that’s flowing through many sources every second, along with brand new types of data.

It’s data that is too large, complex and dynamic for any conventional data tools to capture, store, manage and analyze.

This data can now be analyzed, which is helpful for healthcare, government, retail manufacturing, and of course, e-Learning.

Big Data storage referred to the problem of storing such a large amount of data.

Big Data analytics was the term for the problem of analyzing all this data.
Big Data refers to the large amounts of unstructured data flowing through numerous sources in our digital world every second. In the e-learning scenario, Big Data is the data produced by learners interacting with the learning content. Big data is collected through Learning Management Systems (LMS), Content Management Systems (CMS) and other media, including social networks via which the learners interact with our learning programs. Due to the rapid advancements in computer processing power, Big Data can now be processed and analyzed, providing us with new insights into how people learn.
In the eLearning environment, that may include:

Who is taking a course (demographics - age, sex, geographic location, educational and professional background, etc.).

Information about how a learner first “discovered” a particular eLearning program (advertisements, social media, corporate websites, referral programs, etc.).

Data about the types of devices used to log-on to a particular course (desktops, smart phones, tablets, etc.).

The types of browsers and operating systems that the eLearning system interacts with.

Progress, assessments, and feedback received from the eLearner.
The Role of Big Data in eLearning

- Shed valuable insight into learning gaps across organizations.
- Identify preferred methods of pursuing eLearning by individuals and groups of employees.
- Highlight the strengths and weaknesses in an organization’s eLearning strategy.
- Provide clues on how to individualize and personalize specific eLearning experiences to provide best results for learners.
WHAT ARE THE BENEFITS OF BIG DATA FOR THE E-LEARNING INDUSTRY?

Big Data can help us to understand the real patterns of our learners more effectively because it allows us to track a learner’s experience in an e-Learning course.

By examining the *digital breadcrumbs* or digital footprints, we’re able to track the learner’s journey throughout the entire learning experience.

By *tracking Big Data in e-Learning*, we can see which parts were too easy and which parts were so difficult that they got stuck.

Some other parts of the journey we can track and analyze are pages they revisit often, sections they recommend to peers, learning styles they prefer and the time of day they learn the best.
In the e-Learning world, when learners interact with content in your course, they produce data—or Big Data.

We’re now able to collect and track this data through learning management systems (LMSs), social networks and other media that tracks how learners interact with aspects of the e-Learning course.

Big Data be processed and analyzed, which is especially helpful for the e-Learning industry.
Big Data will change the way we approach e-Learning design by enabling developers to personalize courses to fit their learners’ individual needs.

Will allow e-Learning professionals to continue to raise the standard for effective and exceptional e-Learning courses.

Learning management system like Lectora Express – The Easy LMS or CourseMill LMS can help you easily track, record and analyze your learners’ Big Data.

The future of e-Learning will continue to be affected by Big Data, creating many opportunities to make online training more effective.

Take advantage of the benefits Big Data offers for your learners as you track their digital breadcrumbs and footprints.
<table>
<thead>
<tr>
<th>BENEFITS OF BIG DATA FOR ELEARNING PROFESSIONALS</th>
<th>BENEFITS OF BIG DATA FOR ELEARNING PROFESSIONALS(Contd…)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Popularity</strong></td>
<td>Big Data analysis can help you identify which courses, modules, or segments of a course are the most popular amongst your audience.</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>By looking at Big Data, you could pin point structural issues with your course design: Why do 96% of eLearners abandon a particular scenario-based exercise half-way through?</td>
</tr>
<tr>
<td><strong>Deployment</strong></td>
<td>You may get invaluable insight on whether particular deployment strategies are worth the time/effort:</td>
</tr>
<tr>
<td><strong>Deployment</strong></td>
<td>Only 1% of students are using a Windows-based platform, with 93% learning from Android-based systems and 6% using iOS</td>
</tr>
<tr>
<td><strong>Deployment</strong></td>
<td>Should you continue to support a multiple OS deployment strategy?</td>
</tr>
</tbody>
</table>
**Design**

Big Data can offer design-tweaking clues for you to consider in your next course update/refresh cycle.

If, in the last 5 years, no employee has ever used the “Download and print” option of the Corporate Expense Policy course – should you spend time and money updating that segment of the course feature?

**Shortened Refresh Cycle**

Big Data is almost instantaneous – you get it immediately upon each interaction.

Could start parsing the data after each batch of learners has finished the course, as opposed to waiting several months before planning your next refresh cycle.
Decision-making on what authoring tools and Learning Management Systems a company should use.

Selecting the most effective delivery mechanism – corporate learning sites, social media platforms, or individual downloadable modules?

Influencing budget allocations for specific eLearning strategies

Data-driven course personalize

Analysis of individual and group behavior as they interact with a course.
Data Objectives.
Start out by defining clear-cut goals and objectives for why you are collecting the data, and what you intend to accomplish from analyzing it.

For instance, “Employee Skills Improvement” should be supported by the types of skills that need improvement, and measurable metrics of what “improvement” means.

Data Assimilation..
Big Data has multiple sources (authoring tools, Learning Management Systems, social media platforms, corporate eLearning sites).

Make sure you cast a broad net and gather all of that data instead of being selective in what you harvest.
BEST PRACTICES TO EFFECTIVELY MANAGE AND ANALYZE BIG DATA (CONT'D.)

**Data Rationalization.**

Not all of the harvested data (the make/model of the device used; the version of the OS; the ID of a corporate terminal used to access the course) will be “actionable” from an eLearning standpoint.

Rationalize (parse) your data based on the analysis goals and objectives - defining clear-cut goals and objectives for why you are collecting the data, and what you intend to accomplish from analyzing it.

**Data Prioritization...**

Sometimes, you may end up having several priorities (skills improvement; course popularity, etc.).

Prioritize your data elements based on the importance of the analysis you wish to conduct.

1. Student Progress/Completion;
2. Proficiency levels;
3. Ratings and Evaluations;
4. Relative Rankings and
5. Return on Investment.
Learning Management System will include a set of big data analysis tools.

3rd party tools like Google Analytics to see how students interact with your online courses.

eLearning data is well protected, possibly through data encryption – especially if it’s being stored outside the corporate environment in the Cloud.
LEARNING ANALYTICS OUTCOME

Discover Patterns within student data
Helps teachers provide more informed support and scaffolding to individual students and conduct more holistic assessments

Predict Future Trends in students’ progress
Elicits how the students might perform in the future, for example in terms of performance or engagement, and plan appropriate support

Recommend Teaching and Learning Actions
Recommendations may refer to educational resources/tools or learning/assessment activities that are appropriate to meet the individual needs of students

Recommendations may be addressed to either teachers or students.
Descriptive Analytics.

Analyze student data and create dashboards that depict meaningful patterns or insights emerging from these analyses.

In this sense it presents “What has already happened” and it is related to the “Discover Patterns within student data” outcome discussed previously.

Examples of Descriptive Learning Analytics tools include

1. SmartKlass and
2. Learning Analytics Enhanced Rubric, which are plugins for the Moodle Learning Management System.
LEARNING ANALYTICS STRANDS (CONT'D.)

Predictive Analytics

Predict future trends in student progress and is commonly used to identify students who might become "at-risk" in terms of low performance or low engagement.

In this sense it presents "What will happen" and it is related to the "Predict Future Trends in students' progress" outcome discussed previously.

Examples of Descriptive Learning Analytics tools

1. Predictive Learning Analytics tools include the Early Warning System, which is a plugin for the BrightBytes Clarity Learning Management System

2. Engagement Analytics tool, which is a plugin for the Moodle Learning Management System
Prescriptive Analytics

Generate recommendations for further teaching and learning actions, e.g., suggest alternative educational resources or tools.

It presents “What should we do” and it is related to the “Recommend Teaching and Learning Actions” outcome discussed previously.

Examples of Descriptive Learning Analytics tools

1. **LearnSmart** tool, developed by McGraw-Hill Education Engagement Analytics tool, which is a plugin for the Moodle Learning Management System.

2. **Adaptive Quiz** tool, which is a plugin for the Moodle Learning Management System.
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2. Adaptive Quiz tool, which is a plugin for the Moodle Learning Management System.
Learning Analytics can support the classroom teachers to provide personalized support to students, by measuring, collecting, processing and reporting on various types of educational data in order to visualize what has already happened, "predicting" what might happen and/or proposing actions to take in response.
Adapted & refined from
An Oklahoma university is taking its physical fitness requirement to the next level.

Oral Roberts University is requiring incoming students to wear Fitbit fitness tracking devices, which measure the number of steps walked, quality of sleep and other metrics.

This data will be tracked by the school and could affect student grades.
Predictive learning analytics

https://www.jisc.ac.uk/reports/the-future-of-data-driven-decision-making
<table>
<thead>
<tr>
<th>TYPE OF ANALYTICS</th>
<th>LEVEL OR OBJECT OF ANALYSIS</th>
<th>WHO BENEFITS?</th>
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<tbody>
<tr>
<td>Learning Analytics</td>
<td>Course-level: social networks, conceptual development, discourse analysis, “intelligent curriculum”</td>
<td>Learners, faculty</td>
</tr>
<tr>
<td></td>
<td>Departmental: predictive modeling, patterns of success/failure</td>
<td>Learners, faculty</td>
</tr>
<tr>
<td>Academic Analytics</td>
<td>Institutional: learner profiles, performance of academics, knowledge flow</td>
<td>Administrators, funders, marketing</td>
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<tr>
<td></td>
<td>Regional (state/provincial): comparisons between systems</td>
<td>Funders, administrators</td>
</tr>
<tr>
<td></td>
<td>National and International</td>
<td>National governments, education authorities</td>
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https://elearningindustry.com/learning-analytics-analyze-lesson
http://www.nwlink.com/~donclark/hrd/history/KSA.html
But formerly it was education for degrees; now it is education for living.”

My competition is not against the runner next to me.

It is against the runner inside of me.

"The only way to make sense out of change is to plunge into it, move with it, and join the dance." — Alan Watts
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