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Abstract

In addition to the technical specifications, compatibility with Learning Management Systems (LMS), reporting capabilities, security measures, and scalability are all important factors to consider when evaluating a Learning Record Stores (LRS). Additionally, seeking out references from other organizations that have implemented the LRS can provide valuable information on its performance and reliability. Conducting thorough AI and LRS can help ensure that it meets the needs and expectations of learning organizations. This paper aims to understand the Learning Record Stores LRS and how it is chosen, used, and assessed. and how can benefit from it in Learning Management Systems (LMS).

Key words: Learning Management Systems (LMS), Learning Record Stores (LRS), Disruption of Digital Learning, Experience Application Programming Interface (xAPI), Artificial Intelligence (AI).

The purposes of this paper are:

- **Know how the incorporation of learning record stores (LRS) with learning management systems (LMS) by AI.**
- **Put a list of ways to choose and assess the quality of learning record stores (LRS).**

Introduction

The LRS was first adopted in the eLearning sector in 2011, seeking to transform eLearning specifications. Before 2011, SCORM was the eLearning software specification for interoperability since 2001. However, the specification could not keep up with technological advancements and needed an update. What followed was extensive research and developments that led to Experience API and the LRS concept. (*https://scorm.com/what-is-an-lrs-learning-record-store/*, n.d.)

A Learning Record Store (LRS) is a system that stores and manages learning-related data, including records of learners' activities, achievements, and experiences. It is a key component of the xAPI ecosystem, receiving, storing, and returning xAPI statements. (*Learning Record Store | Learning Pool*, 2019)

LRSs can be standalone products or part of a Learning Analytics Platform (LAP) and can communicate with other LRSs for data portability. LRSs enable modern tracking of various learning experiences, including real-world activities and job performance, and can share data with other systems for reporting and analytics. Rustici Software offers products that support xAPI, including SCORM Cloud with a hosted LRS and Rustici Engine with an installable LRS. Learning Locker, an open-source. (*Learning Record Store (LRS)*, 2021)

Explanation of Disruption of Digital Learning

Digital disruption in teaching and learning refers to the impact of disruptive technologies on educational institutions, reshaping the roles of learners, teachers, and policymakers. The concept focuses on creating value within and across markets, altering strategic directions, and emphasizing the importance of understanding disruptive technologies in the business core and IS degree program electives. (Geoffrey et al., 2019) Causes, prevention, and interventions regarding disruptions in digital teaching are also important considerations, with research focusing on terminology, methodological approaches, causes, prevention, and intervention strategies. (Ingo & interventions, 2022) (Bob & Elizabeth, 2021)

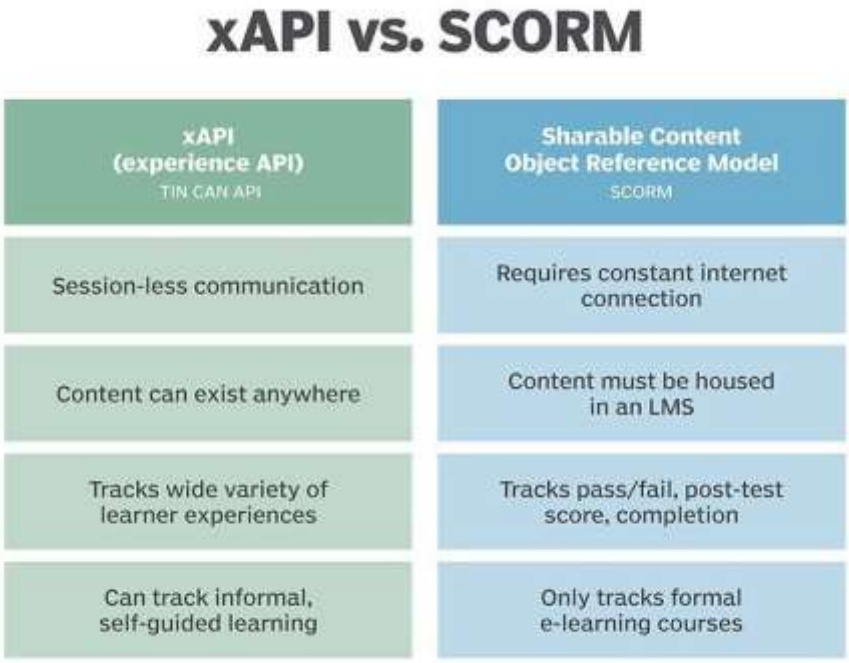
Impact of digital learning disruptions

The impact of digital learning disruption has led to a shift from traditional to online learning during the COVID-19 pandemic. Students with higher digital resilience and self-directed learning readiness have been able to adapt to online learning environments using various digital tools and resources. The digital transformation in higher education is connecting students' digital resilience with their self-directed learning readiness, emphasizing the importance of deliberate design and teaching of self-directed learning in formal learning environments. The COVID-19 disruption has accelerated the exploration of more expansive learning ecologies that encourage self-directed learning across formal and informal environments. Formal learning environments can incorporate activity-based learning approaches within virtual learning environments (VLEs) to enhance overall learning effectiveness. The pandemic has highlighted the need for educational institutions to leverage disruptive technologies to enhance learning and teaching, recognizing the blurred lines between educational, communication, and social media technologies. (Henk et al., 2022)

Explanation of xAPI

The xAPI, or Experience API, is a specification that allows tracking and reporting of learning activities across various platforms and devices. It enables the creation of xAPI statements to track learners'

activities in different application fields, such as what learners read in an application and how long it took. Developers can define xAPI vocabulary and use tools like the xAPI Definitions Fetcher to simplify the process of generating xAPI statements and synchronizing definitions. The xAPI Definitions Fetcher helps developers by translating pre-defined xAPI vocabulary into C# classes, reducing the amount of code needed, and providing intelligent code completion. It also supports exporting for different programming languages like JavaScript, Java, and Python. (Matthias et al., 2022)



Shape (1) Experience Application Programming Interface (xAPI)

problems xAPI solve

XAPI solves problems related to simplifying tracking setup in VR learning scenarios, generating xAPI statements, and synchronizing xAPI definitions for developers. It aims to make the synchronization of xAPI definitions easier by creating a library to share and reuse in other projects. Additionally, xAPI helps in providing inner-loop feedback in real-time, AI-based training recommendations, and personalized visualizations to improve learning retention. Problems can be summarized as follows:

- Support many content types.
- Simplicity to implement.
- Portable content.
- Improved access to run-time data.
- Support offline scenarios. (Matthias et al., 2022) (Michael, 2020)

benefits of using xAPI in digital learning

XAPI offers the ability to track learning activities both formally and informally, including games, simulations, virtual worlds, social

learning, self-directed learning, collaboration, and team-based learning. It allows for capturing data about a person or group's activities from various technologies, online or offline, and focuses on tracking learning experiences wherever and however they occur. xAPI is seen as the next generation of SCORM, providing a more modern and flexible approach to learning technology. (Diana & Daniel, 2014) (Lim, 2018) (Matthias et al., 2022) (Adnan et al., 2018)

Shape (2) Learning Record Stores (LRS)

Definition of Learning Record Stores (LRS)

Systems that store data by receiving xAPI include Learning Record Stores (LRS), which integrate with various systems like LMS, LCMS, VLE, HR systems, and more. They support real-time communication, data export, and data migration tools. xAPI also enables detailed data capture for analytics purposes to answer specific questions related to learning experiences, learner performance, and resource usage. (Berking, 2015)

Explanation of Learning Record Store (LRS)

Learning Record Store (LRS) is a system that stores learning information and is essential for implementing the xAPI. It needs to be part of a larger learning ecosystem that includes learning activity providers, content generating xAPI statements, and systems applying data analytics. Most LRSs focus on tracking asynchronous eLearning behavior. A global digital identification system and personal learning record store are contested concepts due to trust issues. Creating a biometric digital identity verification system linked to a personal learning record store can offer additional educational resources and opportunities. However, the realization of combining institutional and informal learning with a tokenized value system has not been achieved yet. (Turkawka, 2019)

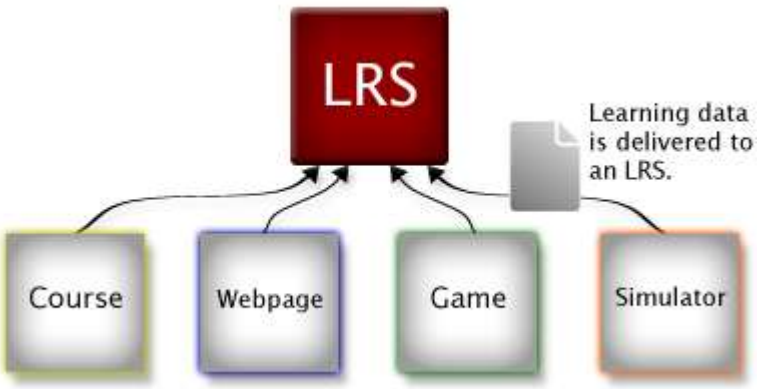
Importance of LRS

LRS systems store data by receiving xAPI statements from various systems, such as LMSs, LXPs, e-learning courseware, and more, such as:

- **Data collection:** the data is stored in a structured format to allow for easy access and analysis. Data captured and collected by an LRS can include time spent on a learning activity, scores and assessment results, completion status, and learning interactions.
- **Data storage:** this data comes from various systems, such as LMSs, learning experience platforms (LXPs), e-learning courseware, mobile apps, simulations, games, and other digital learning tools. LRSs are designed to handle large amounts of data in a structured format. This allows for easy access and analysis.
- **Data analysis:** LRSs can handle large amounts of data and provide data analysis tools to generate reports, visualize trends, and identify patterns in learner behavior.
- **Data sharing:** APIs allow for data sharing among different systems, ensuring integration with other learning technologies.
- **Data security:** data security is crucial, with LRSs storing data securely and providing access controls to authorized personnel. (Juan et al., 2017)

LRSs are subsumed by LMSs

LRS capability is a logical addition to LMSs, along with the reporting and analytics capabilities that account for and manipulate xAPI statement data. The value proposition of adding the ability to measure micro-level learning behaviors from a variety of sources is compelling to any training manager who is an LMS customer. These behaviors could include a learner's participation in forums, how many times they have created and shared annotations to a document, and what parts of a video they reviewed more than once. ADL predicts that the prospect of the availability of these measurable micro-level training metrics will eventually convince training and other managers to put LRS capabilities into their list of requirements, not just for an LMS but for corporate portals, ERP systems, and other platforms. (Berking, 2015)



Shape (3) LRSs are subsumed by LMSs

Categories and examples of LRS systems

The major categories of Learning Record Store (LRS) systems include those without data analytics engines. These systems focus on system integration, supporting real-time communication between LRSs, and enabling data export and import with various enterprise systems like learning management systems (LMS), human resources (HR) databases, and more. They also allow for add-ons and integration using an open architecture. Examples of LRS systems can be summarized as follows:

- **LRSs without data analytics engines**: The IBM Watsonx.data platform allows users to access all their data across hybrid cloud environments and connect to data in minutes with built-in governance and security. It supports multiple query engines for analytics workloads, reducing data warehouse costs by up to 50%. No-Code Data Analytics Tools like Google Data Studio, Qlik Sense, Sisense, Skills.ai, and Oracle OBIEE offer extensive customization options and integration with various data sources. (*IBM watsonx.data: An Open, Hybrid, Governed Data Store*, 2023)
- **LRSs with integrated data analytics engines**: Logical big data integration system EasyBDI provides logical integration of data and high-level business-oriented abstractions, allowing users to submit analytical queries to retrieve data from distributed sources without knowing technical details. The system minimizes overhead compared to distribute query execution times. (*https://www.qlik.com/us/products/qlik-data-analytics*,2020) (*Logical Big Data Integration and Near Real-time Data Analytics*, 2023) (*DataGPT - How It Works*, 2023)
- **LMS/LCMS with integrated LRS capability:** An LMS focuses on content delivery and management, while an LRS tracks detailed learning experiences and data. The cost implications of implementing an LMS are generally higher due to its broader functionalities compared to the more specialized LRS. Organizations should assess their specific needs to decide whether they require an LMS, an LRS, or both based on their learning strategy, technological infrastructure, and budget. Trends in LMS and LRS technology include AI integration, personalized learning, and immersive technologies like VR and AR. LRS is designed to receive, track, and store xAPI statements, while an LMS manages all learning needs and tracks and reports statements through its native reporting features. Choosing the right LRS for an organization involves considering factors like functionality, durability, and scalability. (Hattingh, 2023) (*Learning Record Store (LRS) Guide: Basics You Need to Know*, 2021)

- **LMS/LCMS with API-based integration with external LRS**: LMS/LCMS with API-based integration with external LRS allows for seamless interaction between the learning management system and external learning record stores, enabling data exchange, automation, and customization. APIs provide access to courses, users, enrollment, grade data, user management, course and content management, enrollment tracking, integration with external tools, reporting, and analytics. Implementing API integration requires thorough planning, documentation, testing, and maintenance to address challenges such as data synchronization, security, system compatibility, and upgrades. It is crucial to have secure authentication mechanisms, use standardized data formats, and stay up-to-date with API changes to ensure a smooth integration experience. (Claned,2023) (Hari & Peter, 2021)

Categories of models for integration

There are many considerations in planning system integration for learning systems. Torrance and Houck (2016) offer the following categories of models for integration:

- LRS and LMS operating independently, side by side, possibly with xAPI statements sent to both concurrently from learning activities and providers. This offers the advantage of flexibility, i.e., either component can be swapped out and managed independently without necessarily affecting the other.
- LRS writes data to the LMS through middleware. It is common for this to take the form of an LRS product integrated as a component into the LMS (there are currently no LRS products integrated with an LMS component, but this could change). This would be needed in the case of an LMS that provides the official “system of record” for an (especially government) organization’s training information; however, stakeholders wish to capture a range of flexible xAPI data that cannot be recorded directly by the LMS. In this scenario, there will need to be rules built into the middleware in order to “translate” semantically-based xAPI statements from the LRS into LMS "database-speak." This is not merely a matter of software engineering; business policy decisions may need to be made. For instance, deciding what constitutes “completion” or “credit” for an informal learning experience such as a coaching session.
- LMS writing data to the LRS (possibly combined with data flowing in the other direction as well) through middleware. Like the above scenario, this is predicated on direct access to the LMS database through APIs (or internal integration, if it is an integrated product). This scenario is recommended in cases where the

organization owns multiple LMSs. Each of these LMSs may handle different types of learning experiences, curricula, etc.; the LRS, because of its flexibility in handling different kinds of data through the xAPI, can serve as the central repository of records from all of the diverse LMSs. This scenario also leverages the reporting and visualization capabilities associated with the LRS, which are often more powerful and flexible than those provided by an LMS.

- LRS writes data to a business intelligence (BI) system. If you have a BI system, this is a good way to take full advantage of its powerful ability to connect and analyze multiple data streams from disparate parts of your organization. The xAPI and an LRS can be a "force multiplier" for your BI system in terms of linking learning to other aspects of your business, especially employee performance, using the very robust analytic and visualization tools commonly built into BI systems. This scenario may also involve LMSs talking to the BI system, giving the BI system the benefit of the kind of data that is housed in the LMS. Since the value proposition of BI systems is the fact that, to perform insightful analytics, they can collect a broad range of data from diverse systems, you may find BI vendors that conveniently already have built-in APIs for LRSs. (Pablo et al., 2016) (Berking, 2015)

Learning Record Stores (LRS) by AI

Learning Record Stores (LRS) combined with AI can offer personalized learning paths and opportunities based on achievements, badges, and certificates. However, AI systems may struggle to align with the values and goals of different communities, leading to potential biases in decision-making. The use of a biometric digital identity verification system can grant access to a personal learning record store, where formal and informal learning achievements are aggregated using xAPI-protocol. The combination of institutional and open educational resources with a tokenized value system for access to paid learning resources has not been fully realized yet.. Feedback and quality assurance are important components for learning success and motivation, with the need for independent, trustworthy parties to verify achievements and certificates. (Turkawka, 2019) (Stijn et al., 2016)

Assess the quality of LRS.

To assess the quality of a Learning Record Store (LRS), you can look for patterns in the data collected, refine xAPI granularity, verbs, and LRS queries, and develop a system features rating matrix to compare different LRS options. It is also important to consider system access and security, as well as the degree of support provided by the LRS for various

features. Contacting top scoring vendors for presentations and demos, as well as gathering feedback from customers about contract negotiations, customizations, the implementation process, and support quality, can also help evaluate the quality of the LRS. Blogs, reviews, and online resources can provide additional insights into the vendor's reputation. (John & Kevin, 2014)

Conclusion

Overall, the transition to using Learning Record Stores (LRS) in educational technology comes with its own set of challenges, such as data security concerns and the need for proper training for users. To successfully implement LRS, steps must be taken to integrate it into existing learning technology infrastructure and migrate data from Learning Management Systems (LMS) effectively. Educators and administrators must also be provided with training programs to ensure they can use LRS effectively. Looking towards the future, advancements and innovations in LRS technology are expected, which will likely have a significant impact on teaching and learning practices.

These advancements may include improved data analytics capabilities, enhanced integration with other learning technologies, and increased customization options for educators. It will be important for educational institutions to stay up-to-date with these developments and adapt their practices accordingly to fully harness the potential of LRS. Overall, the continued evolution of LRS technology holds great promise for revolutionizing the way educators track and analyze student progress, ultimately leading to more personalized and effective learning experiences.

Recommendations

In order to successfully transition to an LRS, suggest some recommendations:

- Address potential obstacles such as data security and privacy concerns.
- Providing training and support for users in adopting LRS training programs for educators and administrators on using LRS effectively.
- Integration strategies should include steps for integrating LRS into existing learning technology infrastructure and best practices for migrating data from LMS to LRS.
- Looking ahead, future implications of LRS in educational technology include predictions for its growth, potential advancements and innovations in LRS technology, and its impact on teaching and learning practices.

- It is recommended to stay informed on the latest developments in LRS technology and continuously assess and adjust implementation strategies to maximize its benefits in educational settings.

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Appendixes

A list of ways to assess the quality of LRS

The following is a comprehensive list of possible requirements for the LRS you are acquiring. It could also be used to assess the quality and suitability of an LRS.

System access and security	YES	NO
1. Conforms to secure application infrastructure standards such as ISO/IEC 27001		
2. Offers the ability to send test statements to verify connection		
3. Allows encryption of sensitive data (i.e., passwords) and session activity (i.e., LRS- related network traffic)		
4. Affords a high level of password security features.		
5. Sets limits on periods of inactivity.		
6. Only users can change their password.		
7. Encrypts stored passwords.		
8. Is able t handle digital signatures. In a government installation, this could require.		
9. Provides a single sign-on, s that users wh have logged in t the enterprise intranet (through a portal, etc.) can get int the LRS without additional login.		
10. Allows login t the LRS t transfer t other enterprise systems (especially HR).		
11. Requires user logon only once per LRS session.		
12. Requires each user t be uniquely identifiable (e.g., user name or user ID).		
13. Runs all user requests through a common security checkpoint in the system architecture.		
14. beyond, and ensures perpetuation of those practices through code review.		
15. Was developed by a single company (the vendor), t avoid risks associated with exposure of code t external organizations		
16. Includes recording (via logs) of system activities.		
17. Has encryption during transfer between all internal services and with external entities.		
18. Features encryption of data at rest.		
19. Manages SSH keys using configuration management and version control's administration functions. For SSL, access t private keys is heavily restricted and only used when updating SSL certificates.		
20. Provides audit trails for changes t data in the system such that the organization can quickly determine the source of unauthorized activity that could be the source of security breaches. These changes could include everything from uploading learning objects t running reports.		
System performance		
1. Has a quality assurance process whereby changes t the xAPI spec or the LRS product are regression tested with an internal test suite t ensure strict compliance with the spec.		
2. Performs with minimal latency under a variety of use case		

scenarios and load conditions.		
3. Can connect t unlimited data sources.		
4. Handles large numbers of concurrent users.		
5. Handles user load efficiently, provisioning and scaling resources t smoothly accommodate fluctuations (especially spikes) in volume of statements sent t it.		
6. Enables Web hooks. i.e., push-based service requests. For instance, if you are making an xAPI-enabled reporting app, and you want t be alerted every time a statement comes in that is relevant t what the app is reporting on, you can configure the LRS t send any statements that come in that fit the criteria for relevant statements. The LRS can get statements from different places, but every time it gets one that is relevant, it is pushed t the reporting app.		
7. Enables Web sockets (a different protocol than HTTP). The analogy here is that the standard way t communicate with an LRS is like mailing a letter (the statement). A Web socket is like a phone call. A Web socket allows much higher throughput. Not all systems support it, because some programming languages don't support it.		
8. Works equally well on all standard Internet browsers, including a reasonable span of legacy versions of those browsers (backward compatibility with 2 year-old versions is often used as a rule of thumb)		
9. Has reasonable system requirements that are attainable within your organization		
10. Uses normalized architectures for hardware and software implementations		
11. Can be load balanced across multiple servers, with the LRS application distributed across multiple application servers and the database itself located elsewhere.		
12. Can be clustered		
13. If other systems rely on the LRS t push data t them, a queuing system is in place t ensure data can be resent if it fails for whatever reason (Betts, 2015)		
14. Has robust mechanisms for coping with machine failure such that n loss of data occurs		
Cost		
1. Offers a free trial		
2. Costs less for the base application license compared t the cost of other similar systems with similar capabilities and feature sets. This includes all TC (total cost of ownership) costs.		
3. Has a licensing agreement that is flexible and easily scalable t reflect changing numbers of learners and administrators. This is especially important if you project substantial growth in your organization, or have "extended enterprise" users		
4. Allows you t meter usage of the system by individual business units, s that you can spread the cost fairly		
5. Costs less for recurring and ongoing support compared t the cost of		

other similar systems		
6. Is projected t cost less for required customizations compared t the cost of customizations for other similar systems		
System integration		
1. Includes data migration tools for moving data permanently from an LRS t and from another LRS or an LMS		
2. Supports LRS t LRS real time communication		
3. Enables Comma Separated Values (CSV) or Excel data export		
4. Interfaces with systems that you might have in your enterprise xAPI support and enhancements		
Supports xAPI recipes for basic use cases Vide Ebooks quizzes		
Analytics, visualizations, and reports		
1. Includes the ability t add custom fields t track additional learner information		
2. Includes RESTful APIs that allow custom views of LRS analytics		
3. Provides the ability t print a variety of tracking-related items, including test scores		
4. Offers xAPI tracking and display of “bookmarklets”		
5. Allows drill down t actual statements (with filters/ search by Activity ID, Verb ID, Agent Value, Agent Property).		
6. Statement viewer function allows filtering by organization hierarchy or custom defined group. Offers a wide variety and number of predefined reports and visualizations		
7. Offers permission levels with different kinds of access t reports.		
8. Provides enhanced query capability beyond the basic xAPI specification requirement		
9. Offers flexible, robust abilities t create custom reports, both internally and by using external tools (including those supplied by other vendors such as Crystal Reports®)		
10. Prints reports easily, with appropriate options		
11. Offers test item analysis functions		
12. Provides the ability t embed reports and visualizations (through a Report API or widget) int other tools, systems, and content, using standards like LTI		
13. Allows sharing of report or visualization (snapshots or real time) by interested parties via sharing of a direct URL		
Ease of use for administrators		
1. Is easy t learn and use, with the ability for users t choose from tiers of features according t the knowledge and expertise of the user. This allows users t start using the program quickly and gradually progress t more complex authoring tiers/feature sets as their skills mature. In other words, users only see features that are relevant t their level of skill and the kind of operations they are capable of performing. Ease of use for administrators is important since it can reduce the skill set requirements and thus the cost of administrators.		
2. Provides user interface customization (not on the level of tiers of features, as above, but on an individual feature basis), s that both		

learners and administrators can optimize for their particular needs		
3. Is easy t install and reconfigure		
4. Attachments t xAPI statements can be accessed without the need t send queries		
5. Manages the administration process efficiently with built-in workflows (for approvals, for instance)		
6. Administrative interfaces are clear, simple, and optimized for usability.		
7. Data retrieval is optimized by creating new indexes based on common requests. You		
8. can know some of this in advance, based on your use case, but it can be an on-going process		
9. Includes options for remote administration from outside the enterprise intranet (through the Internet) and possibly via a mobile device		
10. Provides features that allow administrators t view role structures in a graphical representation (diagrams, outlines, etc.)		
11. Provides clear, specific error messages that aid in troubleshooting. A generic message that is the same for all errors is not acceptable. You als want t avoid cryptic, technical messages that can only be interpreted by the LRS's software developers. Messages should be understandable not just t technically inclined LRS administrators, but als t xAPI activity providers wh want t d testing of content. Also, it is ideal for error messages t vary depending on whether you are in the test vs. the production system.		
12. Has a feature t store favorite locations within the system		
13. Allows saving of a workspace		
Scalability		
1. Has a scalable architecture that allows the system t expand as the number of users increases. The following factors should be taken int account in your planning: Number of concurrent users (current and in the foreseeable future) xAPI statement volume restrictions		
2. Supports large media attachments (e.g., videos) that can be attached t xAPI statements, supporting a variety of file types and file sizes		
3. Has a scalable architecture, enabling evolution of the client installation without forcing them t g through frequent major version upgrades		
4. Allows configuration of a data distribution network (interconnect distribution peers through a common distribution server)		
5. Supports multiple languages		
Vendor characteristics		
1. Has consulting experience and service arrangements. This is especially critical for LRSs, since the data-driven learning paradigm and xAPI supporting it is s new. You may need extensive help in designing ecosystem-wide solutions if you are new t this space. Your consulting needs will probably not just be limited t getting help configuring or using your LRS.		
2. Has a good reputation among acquisition and system owner		

communities. Ask the vendor wh their other clients are, what they use the system for, and see if you can talk t these clients about their experience using the system. Look for negative comments posted on the Internet by members of these communities.		
3. Is willing t openly discuss with you changes in the learning landscape, and their roadmap for adapting t these changes.		
4. Has been in the LRS market for at least a year. Avoid the first release of a new system.		
5. Has not created the product merely as an add-on t an ERP or some other system, in order t be able t sell it t customers desperate t add an LRS t their existing system. Although the cost will probably be lower than purchasing a separate LRS, and the system will obviously be well-integrated with the ERP, it can mean that the LRS receives short shrift in design and usability.		
6. Has a clear technology roadmap with a reasonable time frame for new versions and additions of new features		
7. Listens t your concerns during interactions with them, especially during dem sessions of their product. How they are in these situations probably reflects how responsive and attentive they will be t your concerns as a customer.		
8. Is financially sound and not in danger of going bankrupt. You may want t consider acquiring Dun and Bradstreet reports for your final vendor candidates, t establish the financial health, stability, and long term business strategy of them.		
9. Is of a stable size, as measured by number of employees, annual revenue, capitalization, etc.		
User training, technical support, and documentation		
1. Has robust support for training of all categories of users: learners, instructors, system administrators, content managers, etc.		
2. Has robust support documentation in a wide variety of forms including tutorials, help, examples, references, and user manuals		
3. Has a variety of Help Desk support options for administrators and learners (telephone, chat, email, etc.). These need t be in synch with the way your organization normally requests help.		
4. Has a Help Desk system that is structured and process driven via trouble call tracking and reporting		
5. Has Help Desk support that coordinates problem resolution with the appropriate parties: vendors, SME's, etc. for problem resolution		
6. Has knowledgeable, experienced support personnel		
7. Is available as close t 24/7 and world-wide as possible		
8. Offers extensive training options: eLearning, vide tutorials, ILT sessions, webinars,		
9. etc.		
10. Has onsite training options. If training is at vendor site, the location(s) are a reasonable distance.		
11. Includes an orientation tutorial for new users		
12. Has a low average turn-around time for Help Desk support		
13. Has a feedback function for suggestions on improving the LRS		

14. Provides technical consulting services options for customizations, implementation, configuration, architecture design, needs analysis, change management services, etc.		

Sites for Learn LRS & xAPI :

- **The actual xAPI specification**
  https://github.com/adlnet/xAPI-Spec
- **xAPI Verbs**
  https://github.com/adlnet/xAPIVerbs
- **xAPI Controlled Vocabulary Ontology**
  http://xapi.vocab.pub/ontology/
- **The xAPI Wrapper**
  https://github.com/adlnet/xAPIWrapper
- **xAPI Dashboard**
  https://github.com/adlnet/xAPI-Dashboard
- **xAPI Lab**
  https://github.com/adlnet/xapi-lab
- **xAPI Statement Viewer**
  https://github.com/adlnet/xapi-statement-viewer
- **xAPI jQuery Mobile**
  https://github.com/adlnet/jxapi
- **SCORM-to-xAPI Wrapper**
  https://github.com/adlnet/SCORM-to-xAPI-Wrapper
- **Examples of SCORM-to-xAPI wrapper use:**
  https://github.com/adlnet/SCORM-to-TLA-
- **xAPI Canteen**
  https://github.com/adlnet/xapi-canteen
- **xAPI Remarks**
  https://github.com/adlnet/xapi-remarks
- **xAPI YouTube**
  https://github.com/adlnet/xapi-youtube
- **xAPI Java Library**
  https://github.com/adlnet/jxapi