Title: Improving the iSTART Application: Key Metrics and Data Analysis

Abstract

This paper discusses the essential metrics and data required to enhance the iSTART (Interactive Strategy Training for Active Reading and Thinking) application. The analysis focuses on five main categories: Motivation, Performance, Learning Analytics, User Experience, and Teacher Metrics. By collecting and analyzing these data points, the application can be continuously refined to maintain effectiveness, engagement, and alignment with educational goals.

Motivation Metrics

Time spent and engagement are crucial indicators of student motivation in educational platforms (Gray, J. A., & DiLoreto, M. (2016); Singh, M., James, P. S., Paul, H., & Bolar, K. (2022)). Metrics in this category include:

- Total time spent on the platform
- Time spent per game and on each planet
- Number of active students per planet
- Frequency of logins and session duration

Game preferences and avatar customization frequency can indicate student investment in the platform, as emotional engagement is positively predicted by learning motivation (Liu, Y., Ma, S., & Chen, Y. (2024); Singh, M., James, P. S., Paul, H., & Bolar, K. (2022)).

Performance Metrics

Tracking performance is essential for understanding student progress:

- Lesson completion rates
- Game scores for mini-games
- Reading comprehension scores
- Frequency and effectiveness of reading strategy usage

Learning motivation positively affects students' course grades, emphasizing the importance of these metrics (Fortier, M. S., Vallerand, R. J., & Guay, F. (1995)).

Learning Analytics

Analysis of learning progress includes:

- Text complexity versus student performance
- Correlation between strategy use and comprehension improvement
- Rate of improvement in reading skills over time
- Concept mastery across different texts

Education systems require high-quality data to monitor student progress and understand the links between inputs, policies, practices, and learning (Kurilovas, E. (2020)).

Learning Analytics can help educators in making early forecasting and prediction towards the academic achievement and performance of students (Mian, Y. S., Khalid, F., Qun, A. W. C., & Ismail, S. S. (2022)). This justifies tracking learning curves and rate of improvement.

User Experience Metrics

To improve the platform's usability:

- Navigation patterns between planets and activities
- Frequency of using different interface elements
- Error rates during activities
- Number and nature of help requests

Digital games enable learners to learn in an engaging, motivating and pleasant way, and we must avoid biases to calculate metrics (Freitag, 2020).

Teacher Metrics

To enhance teacher tools:

- Frequency and types of assignments created
- Progress monitoring patterns
- Text library usage

Conclusion

By collecting and analyzing these metrics, the iSTART application can be personalized, optimized, and enhanced to better support student learning and teacher effectiveness. This data-driven approach allows for continuous refinement, ensuring the application remains engaging and aligned with educational objectives.

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