WHY LEARNING ANALYTICS IS STILL UNCOMMON IN COURSE DESIGN PRACTICES

A Confession from Instructional Designers in Higher Education
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Introduction – What’s Known about Learning Analytics

<table>
<thead>
<tr>
<th>Icon</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Graph]</td>
<td>The use of emerging Learning Analytics (LA) is linked positively to learning outcomes and student success (Denley, 2014; Dietz-Uhler &amp; Hurn, 2013; Gašević, Dawson, Rogers, &amp; Gasevic, 2016)</td>
</tr>
<tr>
<td>![Book]</td>
<td>Data analyzed from LA helps (re)design courses and prioritizing learners’ needs (Dietz-Uhler &amp; Hurn, 2013)</td>
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<tr>
<td>![Bitcoin]</td>
<td>Buy-in and support from stakeholders are needed in leveraging successful LA (De Freitas et al., 2015; Ifenthaler, 2017).</td>
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</table>
Introduction – But…..

What do we know about buy-in from stakeholders like instructional designer (IDs)?

What are their perception, belief, attitude?

What are the current state of LA-related practices in LA?
Defining Learning Analytics

The Measurement

Collection

Analysis

Reporting of Data

About learners and their contexts, for the purpose of understanding and optimizing learning and the environment in which it occurs.

Siemens & Long (2011, p. 32)
Emergence of LA in Higher Education

Ubiquity of Learning Management System (LMS)

Not only for content delivery and course engagement

But also for tracking and monitoring learning activities

Detecting struggling (at-risk) students by analyzing course usage data

Dahlstrom, Brooks, & Bichsel (2014); You (2016); Macfadyen & Dawson (2010); Casey & Azcona (2017); Valsamidis, Kontogiannis, Kazanidis, Theodosiou, & Karakos (2012)
Instructional Design = Complex Decision-Making Process

“... there is no formula for great design. [Instead,] it is a problem-solving process... .” (Christensen, 2008, p. 29).

- Design process is rarely smooth, systematic, or linear (Tracey & Richey, 1997).
- IDs considers contextual factors such as nature of learners, nature of learning task, and learning environment (Gagné, 1985; Keller, 1987; Morrison, Ross, Kalman, & Kemp, 2013; Leshin, Pollack & Reigluth, 1992; Smith & Ragan, 1993) to inform design decisions.
- IDs in higher education make design decisions based on evidence like students’ traits, prior performance, subject difficulty, and completion rates of the course.
  - The utilization of data analytics plays an essential role in providing such evidence (Dietz et al., 2018).
Technology Acceptance Models

TAM

Perceived usefulness
Perceived ease of use

TAM 2 & TAM 3

Expansion of determinant factors underlying two primary constructs

Synthesized Determinants of all TAMs

Individual differences  System characteristics  Social influence  Facilitating conditions

Davis (1989); Venkatesh (2000); Venkatesh & Bala (2008)
RESEARCH QUESTION

How do IDs’ in higher education perceive their experience integrating LA approach into course design from the lens of four synthesized determinants?
Methodology – Research Design

**Phenomenological Approach**

- Obtaining insights resulting from experiences (Goulding, 2005).
- Understanding the “phenomena from the perspectives of people involved” (Welman & Kruger, 1999, p. 189)

**Bracketing the Phenomena**

- IDs’ experiences in course design
- LA integration into course design
- Higher education setting
Participant Sampling

Purposive, homogeneous sampling
- Must be instructional designers
- Must work (recently worked) in higher education

Recruitment
- Professional organization
- Social Media groups
- Snowballing
Participants Description

Chart Title

- Geographical Location (West, Midwest, Southern, Northeast)
- Institutional Sector (Public, Private)
- Gender (Female, Male)
- Interview Type (Focus Group, Individual Interview, Email Interview)
- Years of Experience (5 or less, 6-10, 11-15, 16 or more)
## Data Collection

<table>
<thead>
<tr>
<th>Interview types:</th>
<th>Materials:</th>
<th>Strategies to increase trustworthiness:</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Focus group</td>
<td>* Web conferencing tool &amp; recording</td>
<td>* In-session member checks on common</td>
</tr>
<tr>
<td>* Individual interviews</td>
<td>* Interview questions and probing questions grounded in the four synthesized TAMs determinants</td>
<td>ideas and key points</td>
</tr>
<tr>
<td>* Both in semistructure format</td>
<td></td>
<td>* Memo: summarized key points</td>
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<tr>
<td>* Email interview</td>
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<td>* Debriefing</td>
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</table>
# Data Analysis (Data Explicitation)

**Coding and thematizing:**
- Structural coding for preliminary analysis and attaining major categories
- In vivo coding for further analysis by focusing on participants' voice
- Coding from both processes were interweaved
- Pattern coding for analyzing commonalities and developing patterned themes

**Materials:**
- Transcription
- Summarized key points in memos
Alignment with Groenewald’s (2004) and Hycner’s (1999) Data explicitation

1. Bracketing & Phenomenology Reduction
   - Structural coding
   - In Vivo coding

2. Delineating Units of Meanings
   - Structural coding
   - In Vivo coding
   - Frequency of mentions

3. Clustering Units of Meaning to Form Themes
   - Pattern coding

4. Summarizing Interview, Validating it
   - Member-checks
   - Summarized key points of each interview

5. Extracting General Themes
   - Pattern coding
   - First draft of results
# Results/Findings

<table>
<thead>
<tr>
<th>1. INDIVIDUAL DIFFERENCES</th>
<th>4. FACILITATING CONDITIONS</th>
<th>3. SOCIAL INFLUENCES</th>
<th>2. SYSTEM CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior exposure and pre-perception</td>
<td>Inadequate supporting tools and infrastructure</td>
<td>Internal drive within the institution</td>
<td>External influence from experts and professional groups/organizations</td>
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<tr>
<td>Pedagogical belief</td>
<td>A need for professional development opportunities</td>
<td>Lack of institutional buy-in and support</td>
<td>Lack of data availability and legibility</td>
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<td></td>
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<td>Lack of user-friendly analytics tool within LMS</td>
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## Individual Differences

### Prior exposure & pre-perception

- Never utilized nor learned LA (2)
- Still learning or possessing fundamental knowledge about LA (9)
- Employing LA approach to a certain extent (7)
- Positive pre-existing perception regardless of the challenges (12)

### Pedagogical belief

- Pedagogy drives the technology (9)
- Assessment holds an essential role in improving learning (4)
“I can't say exactly what it could do. But, I can see the power in what it could do.”

“I have a plug-in my campus account that will let me see where students use the most just by the page.”

“... it could come in the most handy when doing an audience analysis.”

“... it captured information on when the user could recognize that something was a problem but could not properly identify what kind of problems.
Individual Differences – Based on Pedagogical Belief

“We could use our instructional design way to ... find out ways in terms of non-technology [non-LA] way.”

“I find that the learning analytics data... is critical. We use ours to map to a set of competencies.”

“I believe in a philosophy if you can’t measure it, you can’t manage it appropriately. So, I don’t try to use any resources or assessment where I can’t get some type of analytics.”
System Characteristics

Lack of data availability & legibility

“The LMS I’ve worked with are all roughly the same, offering extremely broad, high-level opportunities rather than granular and meaningful.”

“There’s the free version which provides you with access to enormous datasets on any number of topics raw data... . That information isn’t really useful ... because it’s not pretty.”

Lack of user-friendly analytics tool within LMS

Current analytics tools in LMS was “meager at best,” thereby discouraging the adoption.

I don’t feel that’s an area we have even begun to tap into as a community of instructional designers yet and I don’t think the technology is quite there yet”

“... the fact that they made analytics an add-on product and has made it costly impacts what we can do. ... I can’t see that it would be financially feasible at this time.”
Social Influence

- Seeing faculty members’ or fellow IDs’ attempt to draw historical student data to diagnose learning performance issues.
- “Student Success” campus initiatives
- Early work by George Siemens
- John Whitmer’s presentations
- AECT conventions
- Forums, blogs, and social media
Facilitating Conditions

“I would like something that's very practical and that I can utilize on my job.”

“access to tools/resources that are xAPI ecosystem compatible to [be] more effectively and efficiently integrate analytics”

• “... and then you need the money for this.”
• “Faculty need to be involved in shaping the goals and providing the resources.”
• “[We] need personnel to gather the data—no, we don’t have adequate personnel to do this.”
Discussion

Rudimentary, informal use of LA in course design practice

Recommending instructors use just-in-time data in an LMS to alert students that are displaying detrimental learning behaviors (Arnold, 2010; Muljana & Placencia, 2018; Dyckhoff, Zielke, Bültmann, Chatti, & Schroeder, 2012; Tabuenca, Kalz, Drachsler, & Specht, 2015).

Using semester-long data to inform subject difficulty, learner characteristics, and issues with achieving positive learning outcomes before any decision of course redesign is made (Dunbar, Dingel, Prat-Resina, 2014; Ifenthaler, 2017; Ifenthaler & Widanapathirana, 2014).

Challenges

Readily available data may have been overlooked
Existing data analytics do not exist in an easy-to-read, meaningfully visualized format.
Implications

**Practice**

Seek synergy among these different groups on campus to ease the integration and implementation (De Freitas et al., 2015; Ifenthaler, 2017; Macfadyen et al., 2014; Nunn et al., 2016).

Needs assessments to identify the current perception, knowledge, and skillset possessed by various stakeholders (Lee, Altschuld, & White, 2007), including IDs, who can take advantages of LA.

Create an incentive system that incentivizes IDs to take online courses and dedicate time to attend conferences may be a strategy that helps stimulate their interest and further advance their skills in this area.

**Research**

The influence of the four factors impact IDs in various contexts (e.g., corporate and healthcare), and other stakeholders in higher education

Encourage experts to share knowledge and practices

Design research and case reporting the implementation of existing LA frameworks proposed by Ifenthaler and Widanapathirana (2014), Persico and Pozzi (2015), Yen, Chen, Lai, and Chuang (2015), and Davies et al. (2017).
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