

VLE Design Characteristics: An Expert Study



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Agenda

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- VLE & Design Characteristics
 - Expert Study
 - Implications
 - Conclusions/Call for Further Research

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Virtual Learning Environments: Definition

- ▶ Virtual Learning Environments (VLE) can be understood as
 - ▶ electronic Information Systems (IS)
 - ▶ for the administrative and didactical support of learning processes
 - ▶ in vocational settings
 - ▶ by systematically providing corporate learners adequate
 - ▶ learning materials and
 - ▶ corresponding collaboration facilities so as to develop intended qualifications [8, 42, 49].

Virtual Learning Environments: Benefits

- ▶ VLE show the following benefits for corporate settings, among others:
 - ▶ efficiency,
 - ▶ individuality,
 - ▶ ubiquity,
 - ▶ convenience,
 - ▶ timeliness,
 - ▶ cost efficiency and
 - ▶ task orientation of VLE-based learning [15, 20, 41].
- ▶ Such advantages may also explain the ever increasing adoption of VLE in corporate training and development [15, 19, 48].

Virtual Learning Environments: How to Ensure VLE Success?

- ▶ The profit of applying VLE strongly depends on their appropriate
 - ▶ development,
 - ▶ implementation and
 - ▶ (permanent) improvementas this will ascertain VLE success [13, 29, 61].

VLE Design Characteristics: Definition

- ▶ VLE design characteristics are understood as
 - ▶ a set of properties inherent to VLE
 - ▶ by which they can be
 - ▶ developed,
 - ▶ implemented and
 - ▶ permanently improved [6, 7, 18, 45]
 - ▶ and which are
 - ▶ conceptually assumed or
 - ▶ empirically verified
- to have a positive impact on system success.

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Expert Study: Foundation

- ▶ Expert studies are employed to gain insights in topical domains which are
 - ▶ theoretically not, or at least
 - ▶ not well developed.
- ▶ In certain respects, this applies to research into VLE design characteristics.
 - ▶ reason why: no completely developed theory of VLE design which allows for a direct elicitation of design characteristics.
- ▶ However, alternative foundations may be found in more general theories of the area of
 - ▶ general IS design or [e.g. 14, 35],
 - ▶ general IS success [e.g. 7, 45].

These IS success theories can also be used to found design characteristic research.

Expert Study: Foundation

- ▶ The IS Success Model (ISSM) [6, 7, 40] presents general success relevant IS characteristics.
- ▶ Basically, the ISSM offers two major groups of success predictors:
 - ▶ system quality and
 - ▶ information quality [6, 7].
- ▶ The ISSM clarifies that system-related and information-related design characteristics constitute essential groups of VLE design characteristics.
- ▶ Being a general theory, the ISSM does not provide more detailed information about VLE design characteristics.
- ▶ It is hence the task of the expert study to ascertain
 - ▶ system as well as
 - ▶ information-related design characteristics of VLE empirically.

Expert Study: Literature Review

- ▶ A plethora of over thirty different design characteristics could be identified.
 - ▶ Problem: increasing number of design characteristics.
 - ▶ Hence, future research should strive for a limited set of major design characteristics.
- ▶ All identified design characteristics could be classified as either system-related or information-related.
 - ▶ Problem: dissent concerning more concrete design characteristics.
 - ▶ Problem: heterogeneity adds to the problem of the mere number, since it is still unclear which concrete design characteristics actually are relevant for success.
 - ▶ Hence, it is necessary to validate design characteristics to attain a set of resilient characteristics.

Expert Study: Literature Review

- ▶ The design characteristics are of rather different granularities.

Basically,

- ▶ very general, coarse-granular characteristics such as “information quality” .
 - ▶ rather medium-granular characteristics (e.g. "personalization“, "clear terminology“).
 - ▶ no fine-granular, detailed, i.e. very specific design characteristics.
 - ▶ granularity of design characteristics evidently is of major importance since expressiveness and usability increase with granularity.
 - ▶ to warrant general validity the expert study may have to get by with a medium granularity.
- ▶ Prevalent lack of explicit definitions of design characteristics.
 - ▶ The expert study mandatorily has to elaborate thorough and explicit definitions of design characteristics.

Expert Study: Literature Review

- ▶ In summary, previous research suggests a set of design characteristics which is
 - ▶ of limited congruence,
 - ▶ of different granularity, and
 - ▶ frequently unclear in meaning.
- ▶ This clearly justifies the necessity of an expert study.
- ▶ However, instead of just adding a further unconnected study, the current state of knowledge is to be used as a base to
 - ▶ contrast, but also
 - ▶ enrich the expert study and thereby integrate it with previous work.

Expert Study: Method

- ▶ The Delphi method was applied to ascertain success relevant
 - ▶ system-,
 - ▶ information-related characteristics of VLE [11, 12, 13, 22].
- ▶ The Delphi methods supports
 - ▶ practical forecasting,
 - ▶ practical decisions,
 - ▶ systematical analysis of complex and multifaceted scientific topics that are not directly and easily accessible via quantitative research approaches [11].
- ▶ A two-phased approach was chosen to elicit design characteristics systematically
 - ▶ *Phase 1*: inquiry, categorization, definition of design characteristics.

Expert Study: Method

Name	Affiliation	Background
Anh Vu, N.-N.	University of Leicester, UK	Computer Scientist
Christina, H.	IMC, Germany	Pedagogue
Dominique, V.	OUNL, the Netherlands	Pedagogue
Effie L.	University of Leicester, UK	Psychologist
Elisabetta, P.	<u>Giunti Labs</u> , Italy	Computer Scientist
Jad, N.	WUW, Austria	Computer Scientist
Kai, H.	TU Darmstadt, Germany	Computer Scientist
Luis, de la F.	UC3M, Spain	Computer Scientist
Marvin, S.	DFKI, Germany	Computer Scientist
Milos, K.	OUNL, the Netherlands	Computer Scientist
Patrick, P.	IMC, Germany	Computer Scientist
Susanne, N.	University of Vienna, Austria	Pedagogue
Volker, Z.	IMC, Germany	Management, and Business Informatics Specialist

Expert Study: Method

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- ▶ A two-phased approach was chosen to elicit design characteristics systematically
 - ▶ *Phase 1*: inquiry, categorization, definition of design characteristics.
 - ▶ *Phase 2*: adjustment and ranking of design characteristics.

Expert Study: Results

VLE-Design-Characteristic	
A. System-Related	
Reliable	A1..3.08·(1.44)
Secure	A2..4.38·(3.52)
Learning-Process-Supportive	A3..4.46·(3.13)
Interactive	A4..4.77·(3.11)
Appealing	A5..5.08·(2.25)
Transparent	A6..5.15·(2.79)
Structured	A7..5.92·(2.22)
Standard-Supportive	A8..6.46·(2.79)
Accessible	A9..6.85·(2.15)
Platform-Independent	A10..7.62·(2.90)

Expert Study: Results

VLE·Design·Characteristicα	
B·Information-Relatedα	α
Understandableα	B1·-2.23·(1.48)α
Consistentα	B2·-2.92·(1.66)α
Credibleα	B3·-3.23·(1.30)α
Challengingα	B4·-3.54·(1.51)α
Multimodalα	B5·-4.00·(1.78)α
Enjoyableα	B6·-4.58·(1.44)α

Expert Study: Results

Design Characteristic	Definition	Source	Exemplary Statement
A. System-Related			
Transparent	VLE are <i>transparent</i> , if they allow the learners to keep an eye on their own and/or other learners' learning history (i.e.: completed and/or passed learning activities of a unit of learning) and current status in the learning process.	literature review	"The e-learning system allows the user to control his/her improvement." [30]
		expert study	"The system enables users to trace why and how certain recommendations are made, how much personal data one allows the system to data mine implicitly/explicitly to produce a user profile."
Standard-Supportive	VLE are <i>standard-supportive</i> , if they facilitate learning materials which are compiled based on approved eLearning standards such as IMS Learning Design [17], or SCORM [1] as these eLearning standards enable learning materials to be widely shared across VLE which also support these standards.	expert study	"Interoperability and standards compliance"

Expert Study: Results

Design Characteristic	Definition	Source	Exemplary Statement
B. Information-Related			
Consistent	The information provided by VLE is <i>consistent</i> , if the learning materials themselves are without contradictions, coherent and presented in a logical order.	literature review	"The use of terms throughout the (E-library) is consistent." [16]
		expert study	"Sequencing of learning objects, tasks, and assessments."
Credible	The information provided by VLE is <i>credible</i> , if they originate from a trustworthy source (e.g. teacher, certified and/or reputable organizations, etc.).	expert study	"[...] how much one trust the credibility of the material (i.e. it does not convey wrong concepts)"

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Implications

- ▶ *Researchers* should deliberate theoretical foundations (e.g. amalgamations of TAM and the ISSM).
- ▶ *Researchers* should aim at increasing specificity of design characteristics without losing general validity (working out the facets).
- ▶ *Researchers* should taken into account interdependencies of design characteristics.
- ▶ *Researchers* should further elaborate
 - ▶ whether different design characteristics contribute rather individually and independently to VLE success or
 - ▶ whether whole bundles or entire configurations of design characteristic are triggering success.
- ▶ *Researchers* should apply pre-prototypes and experiments for evaluation purposes [5, 36].

Implications

- ▶ *Practitioners* could be equipped with comprehensive (check-)lists for either managing the
 - ▶ development,
 - ▶ implementation or
 - ▶ improvement of VLE.

- ▶ *Practitioners* should
 - ▶ refine and customize such (check-)lists towards individual corporate settings .
 - ▶ consider the (check-)list that may lead to practical HRIS
 - ▶ development-,
 - ▶ implementation- and
 - ▶ improvement-processes to foster HRIS succes.

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Conclusions/Call for Further Research

- ▶ A comprehensive literature review and an initial expert study were carried out yielding a systematic list of well-defined
 - ▶ system- and
 - ▶ information-related design characteristics of VLE.
- ▶ This hopefully will stimulate future research, especially quantitative studies which
 - ▶ evaluate and deepen the insights offered,
 - ▶ instruct future practical development, selection and evaluation projects,while both streams may finally contribute to improved VLE which support better corporate training and development endeavors.

Thank you for your attention!



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