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Towards Understanding Social Software and Its Impact on Corporate E-Learning Motivation

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Abstract. This research combines recent discussions in the cross-disciplinary areas of e-learning, social software, and training motivation. On the one hand, e-learning with its role in a fast paced knowledge society, its potential to revolutionize education and the gap between research and practitioners is already in discussion for years. Discussions are becoming more intense with the rise of social software. On the other hand, human resources, life-long learning, and motivating employees to participate in trainings appear critical to organizations. This research focuses on e-learning in the corporate context and examines the impact of social software features on user motivation based on a review of training motivation literature and on 39 interviews conducted in an international IT services company. Findings suggest that the impact of social software features is still unknown, and that differentiating them by the learner's needs leads to further insights.

Keywords: E-learning, Social software, Training motivation, Human resource IS

1   Introduction

Trained employees are the most critical resource in a knowledge society [1] but knowledge becomes quickly outdated due to the increasing pace of changes. Life-long learning becomes more than a popular phrase. The need for flexible ways of training is eminent and no longer met by constantly updating traditional class-room trainings. It is therefore not surprising that e-learning was thought to be one of the fastest growing sectors [2] and to revolutionize education [3]. While successful adoption of e-learning implementations was considerable in academia [4], it was only limited in the corporate context [5]. The reason for this lack of success is unlikely to be the e-learning technology, content or design as these factors hardly differ between academic and corporate contexts. The contextual difference is more likely to stem from the ultimate beneficiary. In the corporate context, it is not the learner ultimately benefiting from e-learning, but the investing corporation. Thus, additional motivation of the learner is one crucial factor for corporate e-learning to be successful [6].

Social software is expected to increase motivation [7-9]. The term social software is used synonymously with web 2.0, which basically refers to web-based software allowing users to not only consume information, but also to generate information and to socially interact with each other [10-11]. The combination of e-learning and social software is also termed e-learning 2.0, which promises a new era in technology enabled learning, potentially providing the means for life-long learning even in dynamic environments [12-14]. Unfortunately, it is not often implemented in the corporate e-learning context yet [15], which is probably why there is no research explaining which and how individual social software features impact motivation in this context. As a result, there is no guidance for practitioners designing, delivering, and implementing e-learning [16], which calls for the research question.

How do social software features impact the motivation for corporate e-learning participation?

The answer could lead to corporate e-learning becoming successful and to life-long learning becoming more than a popular phrase.

This research uses a narrow definition of e-learning to only include asynchronous technologies, i.e., technologies that provide electronic, time and place-independent access to knowledge, which is preprocessed for educational purposes. By contrast, synchronous technologies such as online conferencing and collaboration tools, which facilitate real-time distance trainings, are not included. This is due to the fact that social human interaction is already part of the definition of synchronous e-learning limiting the potential impact of additional social features on motivation.

The subsequent structure of this research is twofold. First, we approach the research question by providing a literature review of the training and e-learning motivation literature. Due to the limited findings, we approach the research question in a second step. By the help of descriptive statistics and an exploratory factor analysis we identify distinct social software factors that potentially impact motivation to participate. This paper finishes with a discussion on the resulting patterns and implications.

2 Reviewing Training Motivation Literature

Since motivation research has a long history and cuts "across all subareas within psychology" [17], a diversity of corporate training motivation models are published in reputable journals of the last 20 years (see Table 1 for examples). Despite the models' differences, they also share common findings and constructs, which can be associated with more abstract motivational facets [18]. Thus, this review is first concerned with comprehensively identifying these abstract motivational facets. Secondly, it evaluates the comprehensiveness of training motivation models using the identified facets and discusses the models' potential to explain the impact of social software features on motivation.

2.1 Overview of Abstract Motivational Facets

Figure 1 illustrates a comprehensive overview of motivational facets, which is based on the conceptual overview of Heckhausen & Heckhausen [19.

With Lewin's Force Field Theory in mind, the overview distinguishes between "Personal and environmental factors" as their combination is critical to explain behavior [20-21]. This part also represents a long history of Personal motivation research starting with Darwin, who basically claimed that humans as biological organisms are driven to survive long enough to reproduce [22], and continuing with subsequent researchers, who refined Darwin's drives using different terminology such as needs, instincts, motives or traits and ergs [23-28].

"Attitudes/expectancies" as well as "Behavior" are originally based on Vroom's Expectancy theory and his Valence-Instrumentality-Expectancy model [29], which was later extended by Porter & Lawler III [30] to one of the most complex motivation models. The resulting overview illustrated in Figure 1 accommodates most commonly used constructs such as Self-Efficacy. Defined as the "judgments as to how well one can execute the requisite behavior" [31], the overview would classify it as a performance expectancy.
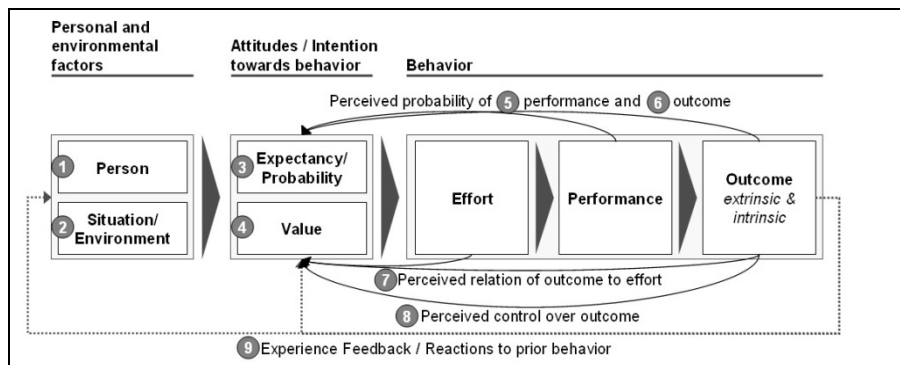

Fig. 1. Comprehensive overview of abstract motivational facets

The motivational facets 7, 8 and 9 in Figure 1 are further extensions. Number 7 and 9 replace Porter & Lawler's III concepts of 'perceived equitable rewards' and 'satisfaction'. Instead, the more comprehensive concept of ' perceived inequity' based on the relation of outcome to effort [32] and a 'feedback loop' suggested by the Social Learning Theory [33] are included. Finally, motivational facet number 8 was added illustrating a different kind of expectancy over the outcome based on the concept of locus of control from the theory of planned behavior (TPB), which postulates high levels of perceived control to strengthen the intention towards a behavior [34].

2.2 Discussion of Review Results

Table 1 contains the results of the review of training motivation models the along nine motivational facets previously illustrated in Figure 1. In the following, these models

are briefly discussed regarding their general theoretical comprehensiveness and regarding their potential to explain the impact of social software features.

Both Birdi et al. [35] as well as Maurer & Tarulli [36] use a remarkably broad range of motivational factors. Unfortunately, the former do not make much use of the underlying basic motivation theory, which leads to the choice of motivational factors appearing rather arbitrary. The latter do not consider the impact of prior experiences critical to the training context [33]. Both models contain the construct "Coworker support", which provides some ground to suggest social software has an impact on motivation, but neither model is actually suitable to substantiate this suggestion and to explain the impact of different social software features.

The Technology Acceptance Model (TAM) [37] is used by Cheng [8], Venkatesh [38[, and Wakefield [7]. All authors extended TAM by adding intrinsic motivational factors, but the resulting models still miss out on other aspects of motivation theory as illustrated in Table 1. Helpful regarding the impact of social software are the models of Cheng and Wakefield as they do claim that system factors such as social software impact usefulness, ease of use, and enjoyment positively [7-8]. Regrettably neither model provides further guidance on individual software features. Furthermore, Wakefield's et al. findings regarding socialness may not be generalizable to an asynchronous e-learning context, because the authors defined and tested socialness with video-based user interaction [7]. In an asynchronous environment, videos are non-interactive and known not to improve e-learning effectiveness [39].

Noe's model [40] serves as a basis for both Garavan et al. [41] and Tharenou [42]. The former authors refer to other research publications such as the theory of planned behavior [43-44] or the below discussed comprehensive model of Hurtz & Williams [45], but they do not make use of them in their own model. The latter author found that motivation to learn, outcome expectancies, and supervisor support play an important role in training motivation. Unfortunately, antecedents such as social software are not considered.

The most comprehensive model on training motivation is that of Hurtz & Williams [45] with only minor limitations. It contains only one personal motive, it lacks the motivational concepts 'perceived inequity', and it sometimes contradicts previous research findings such as those regarding "perceived control", which does not correlate with intention as it should according to TPB [43-44]. Unfortunately, social factors only comprise social pressure and social support, which does not include social interactivity as provided by social software features. As a result, even this most comprehensive model does not allow deriving hypotheses regarding the potential impact of social software features on motivation to participate.

For more obvious reasons, the three remaining research models are also not helpful in explaining the potential impact of social software. Chiu et al. [46] exclusively focus on the concepts fairness and quality, which are not only rarely used to explain e-learning participation, but also too broad to explain the impact of social software features. Clark et al. [47] explicitly use a non-comprehensive model excluding system factors, and Noe and Wilk [48] disprove their research model.

The work of Soliman and Beaudry is not included in Table 1 as it is still research-in-progress, but worth mentioning in this context [49]. They explicitly opted against

using an established, empirically supported research model in favor of a more general Person-Environment Fit based approach trying to explain the impact of social software on system use in general. Once finalized, this research could yield findings relevant to the context of corporate e-learning.

Table 1. Comparison of training motivation models by nine antecedents of behavior (see Figure 1)

	(1) Person	(2) Environment	(3) Expectancy	(4) Valence	(5) Probability of performance	(6) Probability of outcome	(7) Inequity / Relation of outcome to effort	(8) Control over outcome	(9) Reactions to prior behavior
Birdi et al. [35]	●	●	●	-	●	●	-	-	-
Cheng [8]	●	●	●	-	●	●	-	-	-
Chiu et al. [46]	-	-	●	-	-	-	●	-	●
Clark et al. [47]	-	●	●	●	-	●	-	-	-
Garavan et al. [41]	-	●	●	-	●	-	-	-	-
Hurtz & Williams [45]	●	●	●	●	●	●	-	-	●
Maurer & Tarulli [36]	●	●	●	●	●	●	-	-	-
Noe & Wilk [48]	●	●	●	-	●	●	-	-	-
Tharenou [42]	●	●	●	●	-	●	-	-	-
Venkatesh. [38]	●	-	●	-	●	●	-	-	-
Wakefield et al. [7]	●	-	●	-	●	●	-	-	-

Summing it up, none of the models discussed, neither the most comprehensive model with regards to motivation theory of Hurtz & Williams [45] nor the most advanced e-learning adoption model of Cheng [8], are detailed enough to explain the impact of social software features on training motivation sufficiently.

3   Identifying Relevant Social Software Artifacts

Although there is no model comprehensively explaining how social software features impact motivation yet (see previous chapter), existing research does support the general assumption that social software features positively impact motivation [8-9], in some cases even on more than one motivational facet [7]. A possible explanation for this influence of social features could be the additional information and support from others, which they provide and which are found to have a positive impact on motivation [50], especially in cases of organizational encouragement [51], of high social presence [52-53], and of a structured and closed societies like the workforce of a corporation [54]. Thus, the proposition, which this research evaluates, is as follows.

Social software features that corporate e-learning users consider favorable i.e., useful in providing relevant information and support from others, have a generally positive impact on motivation, which may vary in the extent of their impact.

The following sections outline the research method, present the findings, and discuss implications for researchers and practitioners.

3.1   Research Method

The aim of this research is to approach the research question by evaluating the proposition stated above. Findings evolve bottom-up from empirical data gathered in structured interviews with corporate e-learning users on their general opinion on social software features in case they were implemented in the corporate e-learning context. This section outlines details on the interviews, the sample, and the analyses performed.

We opted for personal interviews in case participants have questions regarding individual features. The interviews are structured because both social software and motivation theory have a long history and are well-defined. Social software features have been around for nearly ten years [10], and research on motivation theory date back to Aristotle [55]. Besides gender and age, the survey included general items such as "Linking the e-learning environment to a social network has a positive influence on my motivation to participate in e-learning (assumption: I decide freely who can view my information and which information about my e-learning participation is made public)" and specific social software features listed in Table 2. For each item, the survey captured both the level of feature implementation in the e-learning environments used so far and the potential favorability of a feature in this context on 7-point Likert-scales ranging from 1 (not implemented/very unfavorable) to 7 (fully implemented/very favorable) with 4 being neutral on the favorability scale.

The sample needs to fulfill three major requirements for the interview results to be meaningful. Participants need to have a genuine interest in learning using IT, they need to be familiar with e-learning in the corporate context, and they need to be very knowledgeable about social software features. The interviewed sample contains 39 young German IS employees of a well-known international IT services company. The participants are working students who work in different departments of the organization with each department having the freedom to use different e-learning platforms. They work in different locations across Germany, cover a wide range of functions including Marketing, Sales, Consulting, Customer Support, and Development, and work on various IT services including hardware and software. The average age of the sample is 22 years, and it contains 15% females. This sample not only has a high need for flexible ways of learning given the high pace of the IT industry, but also comprises the IS enthusiasm required to be most familiar with social software features.

SPSS version 19 supported both a descriptive analysis and an exploratory factor analysis. The former analysis helps identifying features that users consider as favorable in the e-learning environment (both median and mean greater 4). The latter analysis uncovers patterns of differentiated use of social software features providing further

insights on the potentially different extent of their impact on motivation. It is combined with a parallel analysis of Horn [56], which determines the final number of main factors. O'Conner provides the necessary SPSS script [57].

3.2 Findings

Overall, the *descriptive analysis* reveals that users have a favorable view on social software features in the context of corporate e-learning (M 4.6 SD 1.63), but these features are hardly implemented in the different e-learning platforms that the participants had exposure to (M 2.05; SD 1.44). Table 2 contains the participants' opinion on each individual features and indicates three general findings, which are as follows. First, not favorable features in an e-learning context are personal forums of peers (M 3.9; SD 1.73) and supervisors (M 3.8; SD 1.69) as well as newsfeeds (M 3.8; SD 1.75) and status messages of others (M 4.0; SD 2.00) since both mean and median are equal or below 4. The second general findings is that e-learning users wish for a closer social interaction with a trainer using asynchronous communication (M 5.1; SD 1.37), comments (M 5.2; SD 1.49), and personal forums (M 4.6; SD 1.65). Finally, the interview participants would value the opinion of their peers expressed in ratings (M 5.4; SD 1.57) and comments (M 5.1; SD 1.69) on e-learning modules. They further consider collaborative learning using forums (M 5.1; SD 1.61) as valuable.

Applying an *exploratory factor analysis* in combination with parallel analysis reveals three main components from the favorable social software features of Table 2. The relatively small sample size of 39 still led to a satisfactory Kaiser-Meyer-Olkin value of 0.673 and a significant Bartlett test of sphericity, which both confirm that the data is usable for such an analysis. Table 2 also includes the resulting factor loadings after Varimax rotation if they are greater than 0.5.

3.3 Discussion

This section discusses both the *descriptive analysis* and *exploratory factor analysis* findings and thereby outlines implications for practice and future research. The first of three findings revealed by the *descriptive analysis* implies that neither personal forums of peers and supervisors, nor newsfeeds and status messages of others will be beneficial if implemented in a corporate e-learning environment. With exception of newsfeeds, these features have in common that they provide communication channels allowing others to state their opinion on e-learning content. The reason why these channels are unfavorable is probably because they are indirect. They can be neglected in future corporate e-learning implementations because direct features such as comments and ratings, which allow others to directly state their opinions on respective e-leaning module or content items, are more favorable. The reason why newsfeeds are unfavorable is unclear. Newsfeeds is a feature used to combine information from different sources on one website [10]. They potentially allow e-learning users to receive individualized information on newly available e-learning modules without having to visit the e-learning platform. As the interview participants might not have

thought of this advantage, it is advisable not to neglect newsfeeds completely during future implementations, but to assign them to a lower priority.

The second finding, a closer social interaction of the learner with the trainer, addresses a long-criticized downside of traditional asynchronous e-learning, which is the absence of a human trainer consultable in case of questions during the learning process. This desperate need for contact with a trainer also explains why the interview participants consider even an indirect communication channel such as a personal forum of a trainer as s favorable. Thus, the general implication is that any social software feature available that allows communication with a trainer is worth implementing.

Finally, as suggested before, corporate e-learning users consider direct channels as favorable, which allow them to contribute, to communicate, and to learn from each other. This potential of social software in the e-learning context is often mentioned [12-14], and its validity supported by the interview participants. Further research and experience is required to identify the best way of how collaborative learning could take place in an asynchronous environment.

The three revealed main components of the *exploratory factor analysis* extends the previous discussion as they appear to be representations of distinguishable user needs in the context of corporate e-learning. Factor A seems to combine features that meet the need of e-learning users to receive additional opinions and meta-information about e-learning modules e.g., ratings or comments of peers and trainers. Furthermore, since e-learning users tend to distinguish between comments of users and comments of trainers, future e-learning environments presenting meta-information should make the same distinction. Possible ways could be to mark comments from the trainer in a different color or to allow participants to hide comments from their peers.

Factors B and C appear to represent the need for two distinct learning methods, which are learning from experts and learning from peers. This implies for practice that building new asynchronously collaborative e-learning modules might be more effective than merely enriching traditional "learning-from-expert" modules with social features. The most obvious and easiest way to implement asynchronous collaboration would be a discussion blackboard or forum, but there is certainly potential for more innovative ways. Similar to a class-room discussion, there could be ways to provide an overall guiding structure to the discussion or to enable users to filter helpful discussion contributions from disturbing individual opinions. It is interesting to note that collaborative forums such as wikis are rather associated with learning from experts (factor B) than with learning from peers (factor C). A possible explanation could be that young IS employees regard collaborative forums such as Wikipedia rather as a mean to receive expert information than as a way to contribute and to collaborate. It could be an indication that corporate e-learning users also do not know how to effectively implement asynchronous collaboration in an e-learning environment, although they generally support the idea of it as mentioned above. Implications for future research on motivation to participate in e-learning include the need to clearly address the distinction between "learning-from-experts" and "learning-from-peers" as the learners appear to have distinct learning preferences, which could impact the motivation to participate.

In summary, the findings on the hypothetical use of social software in a corporate e-learning environment provide the necessary guidance and insights for practitioners and future researchers [16], but they do not finally answer the research question on how social software features impact motivation. Joining other researchers in calling for more design research in the e-learning space [58-59], this research also believes that the iterative trial-and-error approach of design science is the ideal approach extending boundaries to unknown research areas [60-63], which could potentially lead to a conclusive answer of the research question.

Table 2. Descriptive statistics and factor loadings of social software features

	Usefulness in e-learning					Factor loadings[c]		
	N[a]	Mean	SD	Min/ Max	Me-dian	A	B	C
Personal forums - text based (blog)								
of peers[b]	38	3.87	(1.73)	1/7	4	-	-	-
of trainers	38	4.61	(1.65)	1/7	5		0.72	
of supervisors[b]	38	3.82	(1.67)	1/7	4	-	-	-
Comments on modules								
from peers	39	5.05	(1.69)	1/7	5	0.60		
from trainers	39	5.18	(1.48)	2/7	5	0.54	0.58	
from supervisors	39	4.62	(1.68)	1/7	5		0.67	
Ratings of modules								
from peers	39	5.41	(1.57)	1/7	6	0.80		
from trainers	39	4.85	(1.57)	2/7	5	0.82		
from supervisors	39	4.38	(1.70)	1/7	5	0.64		
Asynchronous communi-cation (chat)								
with peers	39	4.67	(1.54)	1/7	5			0.78
with trainers	39	5.10	(1.37)	2/7	5			0.80
with supervisors	39	4.10	(1.59)	1/7	4		0.80	
Comments on items	39	4.64	(1.74)	1/7	5	0.74		
Sharing of items with others	39	4.44	(1.80)	1/7	5	0.78		
Collaborative forum (wiki)	39	5.13	(1.61)	1/7	5		0.66	
Earmarking of items (tagging)	39	4.79	(1.47)	2/7	5	0.57		0.58
Search content by person	39	4.13	(1.66)	1/7	4			0.62
Status messages (micro blogs) [b]	38	4.00	(2.00)	1/7	4	-	-	-
Newsfeed on trainings (RSS) [b]	38	3.82	(1.75)	1/7	4	-	-	-

a) N varies due to missing data
b) excluded from factor analysis since mean and media ≤ 4
c) Factor loadings <0.5 are not displayed

4 Limitations

This research found that the research question on how social software features impact motivation to participate is still open, but it does not provide an empirically supported research model conclusively answering it. Instead, providing the necessary link between expertise in social software and corporate e-learning, it paves the way for future research on this question. Although sufficient for this research purposes, the sample size is relatively small and taken from only one large organization limiting generalizability of the findings.

5 Conclusion

Current research does provide evidence for a positive impact of social software on training motivation, but it does not explain the impact of individual features leaving practitioners without guidance and leading to a gap between e-learning researchers and practitioners [16]. The literature part of this research corroborates the eminence of this gap, while the interview part contributes to closing this gap by providing insights and guidance for future implementations and research. It does not conclusively answer the research question and supports the opinion of other e-learning researcher calling for further design research [58-59], which aims for both conclusively answering the research question and closing the gap to practitioners.

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