HYBRID TOOLBOXES: CONCEPTUAL AND EMPIRICAL ANALYSIS OF BLENDING PATTERNS IN APPLICATION OF HYBRID MEDIA

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Abstract. Hybrid media concepts, i.e. especially combinations of face-to-face instruments and electronic media, represent a standard in many fields of application for quite a long time. Such combinations of diverse, and thus hybrid instruments are meanwhile quite commonly used, for example, in marketing, in retail business, for communication in virtual enterprises, in internal communication processes, in human resource development and in higher education. By combining strengths of two or more media and by mutually compensating their weaknesses, hybrid media concepts aim at enhancing performance with respect to effectiveness and efficiency. So far, however, scientific discussion lacks a common understanding of the architecture of hybrid media concepts as well as empirical evidence on the application of hybrid media in practice. Hence, it is unclear to what extent the performance potential of hybrid media concepts is utilized in different application fields and what the drivers of the use and performance of hybrid media concepts are. This article presents and discusses both a conceptualization of hybrid media in terms of diversity, proportions and coupling of hybrid concepts and empirical evidence on hybrid media concepts in two typical application fields: internal communication in change management and blended learning in higher education.

Keywords: Hybrid media concepts, hybrid management concepts, blended learning, electronic communication, change management, e-learning, higher education.

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1. Introduction

Solving problems by applying a mix of two or more items instead of relying on a sole instrument represents a standard procedure in numerous management domains: the hall of fame contains prominent examples such as marketing mix and portfolio management. The

underlying diversification enables both risk handling and generates synergy. In general, the major benefit of mixed approaches is enhanced effectiveness. With respect to efficiency, the high costs of multiple instruments are supposed to be overcompensated by the benefits of such richness. The potential of mixed toolboxes is used to leverage the performance in a broad range of application fields, ranging from on-the-job and off-the-job training to private-public partnerships. Hybrid mixes in terms of combining antithetical and redundant components are being integrated, for example, in brick & click business, hybrid competitive strategies (e.g. mass customization; Pine 1999; glocalization, Raz 2009, etc.), hybrid governance structures (e.g. joint ventures, networks, etc.), and augmented or mixed reality (Klopfer 2008).

Most hybrid approaches are "simplistic" in terms of being based on one-dimensional continuums bridging antithetical extremes, such as the market-hierarchy continuum, the product-service continuum or the reality-virtuality continuum (Milgram, Kishino 1994). In fact, in order to analyze, categorize and design hybrid toolboxes, a multidimensional approach is needed that is based on three parameters of blending:

Scope: This dimension covers the quantitative aspects of blending, i.e. the number of tools incorporated in the blended toolbox and the proportions of blending, i.e. the ratio of percentage of use of the tools in question. For example, 50:50-proportions stand for balanced blending while an 80:20-ratio indicates the dominance of one tool category.

Diversity: A combination of workshops, flyers, meetings and a letter from the CEO in the employees' magazine characterizes homogeneous blending since all tools in the list rely on conventional communication via physical meetings or print media. The level of diversity increases when both face-to-face tools and electronic media (e.g. e-mail, virtual communities and weblogs) are used. Diversity basically stems from a contrast between tools (heterogeneous blending), since electronic media, unlike face-to-face management, go along with asynchronous communication and lack a direct contact between the participating players.

Coupling: Blending ranges from loose to tight coupling of tools. In the case of loose coupling, managers pick different tools out of a blended toolbox to be applied in distinct sectors or stages of a project. By this strictly separated handling, tools can be adjusted to different segments of the context (e.g. different target groups like employees versus temporary manpower, top management versus lower management), preferences of clients (reflecting their respective corporate culture) and modules of a management concept (e.g. redesigned business processes, organization charts, incentive systems, lay-offs). From a rational management point of view, this corresponds to the idea of contingent management with respect to tool utilization. Likewise, face-to-face communication in the pilot phase of a project can be combined with electronic communication in the roll out-phase which allows an adjustment to the size of the respective target groups.

Tight coupling is related to toolboxes either in terms of blended menus or blended bundles. Blended menus offer at least two tools (e.g. e-mail or telephone, print media or electronic newsletters, physical workshops or virtual meetings on internet community platforms) as alternative options. Providing menus is client-friendly but quite costly: since tools are not pre-selected within a contingent management approach (i.e. loose coupling), the entire range of diverse options has to be provided until employees or clients make their choices.

In blended bundles, tight coupling is performed in a "total" fashion – yielding new genuinely hybrid tools that incorporate both genes of their parent tools: hybrid project meetings are not either face-to-face or virtual, but semi-virtual with some team members participating physically, others virtually via videoconferencing. Communication is neither purely top-down nor bottom-up, but takes place in an iterative down-up process.

Each of the three dimensions also serves as a scale to measure the level of hybridity of tool blending. A broad, balanced scope of heterogeneous and tightly coupled tool bundles represents the maximum challenge for managers because the performance of the blended toolbox cannot be easily traced back to the strengths and weaknesses of the tool components in question. Focused, unbalanced homogeneous and loosely coupled toolboxes on the other hand are by far easier to understand and to evaluate.

2. Domains of hybrid media concepts: communication and learning

Media mixes in communication and learning represent excellent domains for studying and designing hybrid toolboxes. Well-known examples for the use of different media are audio-visual presentations, e-mails to deliver the basic information prior to letters (as often used for invitations to conferences), computer-assisted telephone interviews and multi-channel offerings of the same content (book and movie, internet downloads of slides/selected chapters to complement textbooks, etc.). Recently, especially mixes consisting of extremely diverse media – labeled as hybrid media concepts – are advocated. Hybrid media concepts are combinations of two or more media which are basically different but fulfill the same functions. Thus, the use of such combinations leads to redundancies.

Communication domain

Hybrid modes of communication and hybrid media are, for example, face-to-face communication vs. electronic communication, print media vs. electronic publishing, telecasts vs. videocasts and – from a historical perspective – mail communication vs. communication by phone. Many telecommunication companies nowadays offer customers a media bundle called triple play, consisting of television, telephony and internet ("entertain, call, surf") that are all based on a single technology. This example for a combination of different media points to a further trend concerning the use of media mixes: such mixes are enabled by the convergence of several technologies and media (e.g. Duffy 2002; Zoch, Smith 2002). Other examples for such an enabling furnished by convergent media are e-mailing with mobile devices, watching television on a PDA (personal digital assistant), or internet telephony and internet television.

The effect of technological convergence is also used for another kind of mix, which is more typical for similar communication channels than for hybrid combinations: content syndication stands for connecting contents across different technologies, formats, standards and (particularly web-based) communication channels, like RSS-feeds (really simple syndication) referring to other websites.

Hybrid organizational forms in communication encompass the differentiation between bilateral communication and group sessions, one-to-many information and many-to-many communication, and direct sender-recipient-relationships and indirect communication via

intermediates. To identify different organizational forms of communication the basic structures of communication, as described by the methods of social network analysis, can be used. Social network analysis differentiates with respect to the degree of centralization star, line, circle and network structures of communication (Scott 2000; Wasserman, Faust 1994).

Especially mixing electronic and face-to-face communication has become a widespread standard. For several different application areas the hybrid combination of direct face-to-face communication (e.g. lectures, workshops, manager-employee-discussions) with electronic communication (e.g. e-mail, intranet portals, internet-based discussion forums) provides versatile benefits. This is why such media mixes are frequently applied in marketing (Duffy 2004; Merrilees, Fenech 2007) as well as for communication processes within virtual enterprises. While the existence of electronic communication is crucial for the definition of a virtual enterprise, it is in fact (practically) always combined with conventional face-to-face instruments. Meanwhile, hybrid media concepts are typical not only for virtual enterprises but also for the internal communication in conventional companies (Catalano 2007; Holtz 2005).

Learning domain

Hybrid media combinations are also typical and widespread in human resource training (e.g. Szücs *et al.* 2009; Johnson *et al.* 2009) and in university education, known as blended learning (e.g. Brennan 2004; Collins, Blake 2007). The concept of blended learning – as a combination of e-learning and classroom teaching – is meanwhile quite commonly used in employee and management development In recent years, signals can be found that blended learning is also increasingly implemented in higher education (Allen, Seaman 2007; Allen *et al.* 2007).

To use blended learning in university teaching and to leverage its advantages, the need for a substantial infrastructure is often mentioned. However, the infrastructure for blended learning does not only consist of information technology (Bullen, Janes 2007) which is by definition required for e-learning (e.g. Kirkley, S., Kirkley, J. 2005). It also encompasses other infrastructural sectors like, for example, organizational aspects (caretakers, coordinative committees, etc.), skill and will factors of the involved persons (learning motivation, self management skills, etc.) and culture (educational philosophy of institutions, teaching as support of learning-principle, etc.) as well as the financial resources dedicated to the implementation and utilization of blended learning. So far, it is unclear whether the infrastructure of blended learning merely plays the role of a context factor or represents a performance driver.

The question arises what benefits (and therefore what performance) such hybrid constructions can achieve. To answer this question, a generic evaluation of hybrid concepts is necessary which in turn builds upon the requirements for high-performing communication media.

3. Drivers of hybrid media application: effectiveness and efficiency

The attractiveness of hybrid media concepts results from the dualistic requirements for communication infrastructures in general: information and communication have to be both effective and efficient (Asif, Sargeant 2000). Effective communication means fulfilling the

respective purpose of communication, for example delivering the right content, choosing the adequate modes of communication and using appropriately asynchronous and synchronous communication forms. Communication efficiency refers to the use of resources for communication, like, for example, the adequate cost level, cost structure (fixed costs for flat-rates vs. variable costs for on-demand business models) and the time consumption of communication. Another efficiency aspect of communication consists in the proportion of the number of communication partners and the necessary infrastructures (e.g. technical infrastructures like telephone, intranet, video conference systems, etc.).

Hybrid communication: richness and reach

Important aspects of communication effectiveness are captured by the concept of richness of communication (different communication channels, feedback functions, individualization), whereas communication efficiency includes aspects of reach of communication (number of communication partners, communication costs) (Evans, Wurster 1999). Obviously, a mix of different instruments leads to a certain degree of richness (and thus effectiveness), since one can choose from a set of different channels according to one's preferences or use different delivery methods depending on the content (Allen *et al.* 2007: 188). By using a media mix, the reach of communication is also enhanced: applying several communication channels normally increases the number of people which can be reached via the communication infrastructure. On the other hand, the combination of multiple media typically comes along with time- and cost-related disadvantages which, in turn, diminish communication efficiency. For example, this is the case when an intranet website provides redundant information which is also delivered in a seminar. The hybrid construction of such mixes encompasses the use of hybrid media as well as hybrid organizational forms of communication.

However, the trend towards media mixes must not be taken for granted or considered the optimal solution which is "naturally" evolving. Amongst others, particularly the high costs of combined media, media infrastructures and communication channels account for efficiency-related disadvantages of hybrid concepts in comparison to non-hybrid ones. Hence, a debate on the open questions associated with hybrid media concepts is inevitable.

Blended learning: personalization and cost management

Effectiveness and efficiency in qualification processes are the drivers for the use of hybrid learning concepts in human resource development of companies (Breitner, Hoppe 2005; Fong *et al.* 2008) as well as in university teaching (Frankenberg, Müller-Böling 2004).

Blended learning is basically used to gain benefits in terms of efficiency as well as of effectiveness (Garrison, Kanuka 2004). E-learning forms can increase the efficiency of learning processes by cost savings which, in turn, build upon their virtualization potential. E-learning can lead to an organizational virtualization of teaching and learning by overcoming temporal and spatial restrictions (Aspden, Helm 2004). Thus, travel costs, facility costs, and payments for teachers can be reduced to a considerable extent. The increase in learning effectiveness is mainly based on the deployment of a diversified mix of methods and media. Thereby, didactical concepts can be improved by using the adequate mixes with respect to different learning contents and different groups of learners. This approach eventually leads to a higher degree of personalization of learning processes. The advantages of blended learning can be accom-

plished by the mutual compensation of weaknesses of extremely diverse learning forms and by bundling their strengths to generate synergy (Garrison, Vaughan 2008: 4 et seq.).

Besides these managerial arguments based on efficiency and effectiveness considerations, the morphology of communication itself advocates hybrid media concepts: communication in principle occurs on different layers (e.g. Barnlund 1968; Lundberg 1990: 9; Sereno, Mortensen 1970; Watzlawick *et al.* 1967). Watzlawick for example distinguishes between a content aspect and a relationship aspect (meta-communication) which both are part of every communication act. This multi-layer structure of communication also drives media mixes, since not all instruments can cover all functions of communication. To foster a relationship between two communication partners, face-to-face communication is usually more appropriate while content can be delivered more efficiently via electronic communication media. Thus, covering all communication purposes and simultaneously paying attention to the performance requirements (effectiveness and efficiency) can best be accomplished by the deployment of media mixes.

Evaluation model for hybrid media concepts

To determine the optimal configuration of hybrid media concepts, an evaluation approach is necessary which is hybrid itself and is thus based on the same design principle as the hybrid configurations. Hybrid configurations can be viewed as derivative constructs consisting of original components like, for example, extremely diverse communication instruments. Hence, evaluating hybrid media mixes is a derivative process, too, i.e. it is based on combining the evaluations of the original media. To keep things simple, the evaluation of the original components can be accomplished in a dichotomous approach. To apply this evaluation model, complete and sufficient knowledge about the strengths and weaknesses of the combined instruments is required. Hence, the approach presented here (see Fig. 1) is based on the approach of rational design of media mixes.

Figure 1 shows the evaluation model for the hybrid combination of face-to-face and electronic media. The evaluation is boiled down to just one characteristic strength and weakness of each cluster of instruments.

Face-to-face instruments like, for example, group discussions or one-on-one discussions often have a strong impact on the motivation by offering the possibility to give direct feedbacks and by satisfying social needs. These advantages, however, mostly come along with high costs for traveling to seminar events, or for the ample time consumption for bilateral discussions. Electronic media like e-mail or intranet portals typically have a high reach, since they are able to deliver management information quickly and easily to all geographically dispersed and asynchronously collaborating employees or team members. However, this broadcasting bears the risk of social deprivation of the communication partners who lack the opportunity of giving a direct feedback in the communication process. Thus, electronic media often fall short of satisfying social needs in communication.

Figure 1 shows two different aspects: the evaluation approach encompasses "productive tensions" (above the diagonal) in a hybrid construction as well as "unproductive frictions" (below the diagonal). To consolidate both effects they must be aggregated taking into consideration weights and positive/negative signs. Moreover, derivative evaluations (synergy,
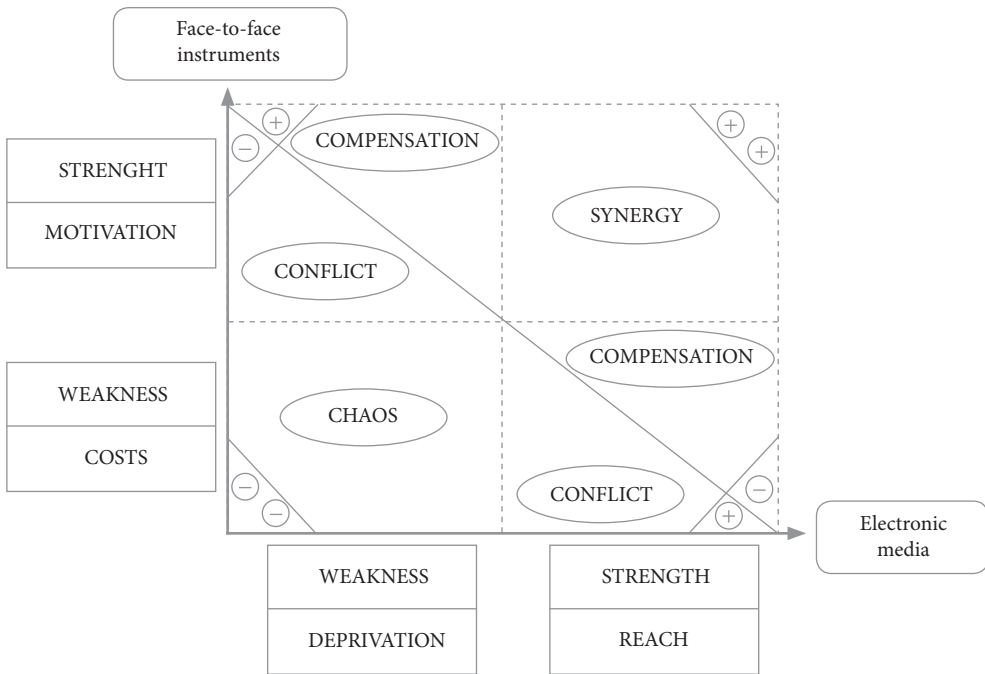
Fig. 1. Evaluation model for hybrid media concepts

conflict, etc.) do not simply arise from an addition of strengths and weaknesses. Reciprocal interactions and compound effects are rather likely to appear and lead to non-additive results. The conjunction of strengths and weaknesses does therefore not always result in compensation, it can also lead to conflicts. For example, combining employee information via the intranet (high reach) with seminars (high richness), which have the same content, does not automatically reduce costs. This effect does only apply when the time needed for the seminar can be reduced by providing general basic information via electronic media prior to the face-to-face seminar (compensation). If redundant content is delivered via both channels, seminar costs do not decrease, the overall costs even rise through the additional use of electronic media: the result can be a conflict with cost restrictions, a direct conflict, an incompatibility, or even chaos, when contradictory contents are delivered via different channels. Respectively, the use of face-to-face communication can not always compensate the risk of deprivation. A kickoff-event at the beginning of a global project aims to make the project members more familiar to each other before they switch to mostly virtual communication. The initial motivation arising from the kickoff-event must be maintained by providing a direct feedback opportunity all through the course of the project. If this does not happen, de-motivation may be the consequence.

4. Hybrid communication: blended concepts in change management

To examine the potential of hybrid media concepts including web 2.0 media in change management, the Department of Organizational Design and Behavior at the University of Stuttgart (Germany) conducted an online survey amongst German, Swiss and Austrian experts in the first quarter of 2008. Moreover, a weblog (www.change-zweinull.de) was installed to enable a virtual sharing of knowledge and exchange of experiences.

The majority of the respondents were contacted directly via personalized e-mail. The respondents were asked to forward the e-mail to other change managers among their colleagues and clients. Furthermore, a link to the survey was integrated in several newsletters. The project weblog also provided the possibility to take part in the survey. 305 respondents filled in the survey. The return rate (in proportion to the number of mails sent) is 15.5%.

Almost half of the respondents are consultants, less than a fourth of the respondents were academic staff and faculty and approximately one sixth of the respondents are employed in manufacturing or service companies.

Change managers (people who have already managed change projects) cover almost three fourths of the respondents. Within this group, change managers predominantly have managed between six and 50 projects and thus are relatively well-experienced in change management. Change managers who have managed more than 50 projects account for only 4.3%. Looking at the change experience with regard to the change categories shows that 45% of all change projects are restructuring projects, followed by strategy shift projects with approximately one third of all projects. Each 30% of the surveyed change managers predominantly manage business process reengineering and cultural change projects. Approximately 20% of change managers frequently also manage IT implementation projects. The survey investigates mainly a) the diffusion rate of face-to-face and electronic communication instruments in change management and b) the existing types of hybrid media configurations as well as their influencing factors.

The results of the survey support the assumption that the use of multiple information and communication instruments can be considered a standard. More than 70% of the respondents frequently or always use at least four instruments in change management. Almost 9% answered that they use ten or more instruments at least frequently. However, these combinations do not automatically represent hybrid media concepts, since a multitude of instruments does not necessarily result in a high diversity of these instruments. Therefore, especially combinations of face-to-face instruments with electronic media are focused.

The instruments examined in the survey are clustered into two groups: face-to-face instruments (workshops, multiplicators, top management presence, employee magazines, seminars, brochures/folders/flyers, one-on-one discussions) and electronic media (virtual communities/internet forums, intranet portals, information videos, e-mail newsletters, web based trainings, podcasts/webcasts, individual weblogs, social networking platforms, wikis, corporate weblogs).

Only 35% of the respondents use two or more electronic media frequently or always. Considering solely the web 2.0 media, this result is even clearer: less then 6% frequently use two or more of these instruments for change management. However, when the answers "fre-

quently" and "sometimes" are taken together, more than 70% of the respondents use at least two electronic instruments in change management, for web 2.0 this result is after all 30%.

Mixing instruments within the group of electronic media is not (yet) very important. At first sight, this could be interpreted as a vote against mixed media concepts. Then, the conceptually more interesting hybrid media concepts were focused. These are hybrid combinations in terms of media stemming from different groups (face-to-face and electronic instruments). Hence, these combinations are characterized by diversity. On the basis of the results of the survey, three different types of media mixes can be distinguished with respect to the patterns of mixing:

Focused media mixes: This mix type is used by change managers who concentrate on a particular "core cluster" of instruments (here: face-to-face instruments). These managers do not use any instrument from the other group.

Diversified media mixes: In diversified mixes, a distinction between core cluster and secondary cluster is not feasible. The respective change managers thus do not have a clear preference for one of the two groups but use instruments from both groups frequently.

Ad-hoc media mixes: These change managers do not use any of the instruments of the given range more frequently than "sometimes". Apparently, there is no preference for one group of instruments. Rather, these change managers decide pragmatically as the case arises which instruments they use for change communication.

Table 1 demonstrates the respective frequencies of hybrid media mixes (consisting of face-to-face and electronic instruments) in the sample.

Table 1. Frequencies of hybrid media mixes

Multitude (total number of instruments used)		Diversity		Total	Ad-hoc mixes
		Focused mixes	Diversified mixes		
	1	2	0	2	
	2	3	0	3	
	3	10	0	10	
	4	17	9	26	
	5	23	16	39	
	6	12	25	37	
	7	0	24	24	
	8	0	26	26	
	9	0	22	22	
	10	0	7	7	
	11	0	8	8	
	12	0	6	6	
	13	0	2	2	
	14	0	1	1	
	16	0	1	1	
Total		67 (30.5%)	147 (67%)	214 (97%)	6 (2.7%)

Differentiating the instruments used with respect to the cluster they belong to, shows – not surprisingly – that merely one of the respondents focuses solely on electronic instruments, while 31% focus face-to-face instruments in change management. Diversified mixes represent the biggest portion in the sample (67%), while ad-hoc mixes account for only 2.7%.

The cluster of ad-hoc mixes were eliminated from further analysis since this kind of mix does not stand for a systematic use of communication instruments in change management. Hence, focused mixes and diversified mixes together (N = 214) represent the relevant sample for the examination of hybrid media mixes.

However, assigning the respondents to the two clusters (focused mixes and diversified mixes) is only a very gross classification, since the dimension of the multitude of instruments is not incorporated in the analysis. A valid measure of hybridity ("mix index") has to encompass both diversity and multitude. The focused as well as the diversified media mixes are more hybrid when they are based on a larger number of communication instruments. The multitude scale was differentiated into "narrow", "medium", and "broad" (see Table 2).

Using this mix index, the following types of mixes can be distinguished according to their degrees of hybridity: narrow focused mixes (1), medium focused mixes (2), medium diversified mixes (3), and broad diversified mixes (4).

Table 2. Typology of hybrid media mixes

		Multitude (focused mixes – diversified mixes)		Total
		focused mixes	diversified mixes	
Diversity	narrow (1 to 3 instruments)	15 (7%)	0 (0%)	15 (7%)
	medium (4 to 6 instruments)	52 (24.3%)	50 (23.4%)	102 (47.7%)
	broad (7 or more instruments)	0 (0%)	97 (45.3%)	97 (45.3%)
Total		**67 (31.3%)**	**147 (68.7%)**	**214 (100%)**

Statistical measures refer to the recoded variable "mix index". The underlying scale was recoded into (1) narrow focused mixes, (2) medium focused mixes, (3) medium diversified mixes, (4) broad diversified mixes. The means have been calculated to the exclusion of the answer "I cannot assess".

Mean = 3.07; median = 3.0; standard deviation = 0.988

A look at the frequencies of the different mix types reveals a peculiar result: only 7% of the surveyed change managers put a narrow focus on face-to-face instruments, i.e. they use at the most three different instruments frequently. Obviously, a multitude of media is essential for change management. Media diversification is only practiced when at least four instruments are used frequently. In the medium interval of the range of communication instruments (four to six instruments) the respondents almost evenly disperse to the two "extreme" categories

focused and diversified mixes, while there are no focused mixes at all for seven instruments or more. The currently great importance of media mixes is furthermore confirmed by the large portion of broad diversified mixes (more than six instruments are used frequently).

Even more important than discovering different media mixes and measure their frequencies is investigating the factors that determine the occurrence of these different media mixes. Therefore, factor analyses and regression analyses were conducted to find out which context factors lead to which patterns of combinations.

The list of potential determinants of media mixing contains:

- – Occupation of the respondents,
- – Industry (in which change projects are managed),
- – Number of projects (number of change projects managed),
- – Employees affected (number of employees affected by a change project),
- – Project manpower (number of employees in a change project team),
- – Assessment of the interaction between face-to-face communication instruments and electronic media in terms of complementing versus substituting of instruments,
- – Change categories (the two most frequently managed categories of change projects).

Table 3. Correlations between context variables and mix index

		Mix index	Occupation	Number of projects	Industry	Employees affected	Project manpower	Interaction	Change categories
Correlation	Mix index		−0.007 (n.s.)	0.013 (n.s.)	−0.086 (n.s.)	0.289 (0.000)	0.150 (0.039)	−0.168 (0.024)	0.003 (n.s.)
	Occupation			−0.398 (0.000)	0.127 (0.069)	−,114 (n.s)	−,127 (0.69)	0.069 (n.s.)	0.075 (n.s.)
	Number of projects				−0.151 (0.038)	0.096 (n.s.)	0.141 (0.040)	−0.006 (n.s.)	0.101 (n.s.)
	Industry					−0.140 (0.050)	−0.116 (n.s.)	0.075 (n.s.)	−0.021 (n.s.)
	Employees affected						0.412 (0.000)	−0.016 (n.s)	−0.077 (n.s.)
	Project manpower							−0.030 (n.s.)	−0.052 (n.s.)
	Interaction								−0.032 (n.s)
	Change categories								

n.s. = no significance

Table 3 illustrates that there is a relatively high positive, statistically significant correlation between the number of employees affected and the mix index. Apparently, there is a tendency

to focus on one group of instruments in smaller projects, while large projects trigger extensive diversification in the use of communication instruments. On the one hand, the complementary use of electronic instruments can be explained by the increasing reach requirements in large projects. Such enhancement of communication reach can only be accomplished efficiently by using internet-based media. On the other hand, effectiveness also requires a higher degree of diversification in projects with a large number of employees affected. With the number of targeted employees increasing (like for examples in company-wide reorganization projects), the heterogeneity of this group of employees also increases. This heterogeneity can be dealt with by using a wide range of communication instruments to ensure individualization of communication which is aligned to the needs and preferences of the respective employees affected by the change project.

The project manpower, i.e. the number of team members, also correlates positively with the mix index, although less strongly and less significantly. Partly, this is due to the relation between the number of employees affected and the number of team members which is also characterized by a high and positive correlation. Projects with a great scope are often also large projects in terms of project manpower. In addition, the number of team members also directly influences the diversification of instruments that are used for the communication between the project members. The degree of diversification increases due to the same reasons: on the one hand, electronic instruments are necessary to enhance the reach of communication; on the other hand, the project requires a higher richness of communication to cope with the increased need for individualization.

The analysis of correlation reveals another relation between a context variable and the mix index which is prima facie surprising: the assessment of the interaction between electronic media and face-to-face communication and the mix index correlate slightly negatively. In other words, those change managers who assume a harmonic complementing between the two groups of instruments (in the evaluation model in figure 1 above the diagonal) still tend to focus on one group of instruments – and thus do not utilize the potential of hybrid concepts. This is most likely caused by context barriers, such as a lack of technical infrastructures, acceptance for the instruments, and/or budget restrictions. Tight budget restrictions are not only a problem in small projects, the whole range of change categories is currently subject to high pressure in terms of efficiency (Capgemini 2008: 43 et seq.). Also, when change managers experienced a low degree of acceptance for such media amongst the employees affected they may refrain from deploying these instruments, even though they assume a harmonic relationship to other communication instruments.

The use of communication instruments is obviously characterized by context-dependent restrictions (see Table 1). Nevertheless, the correlations between project size and mix index show that media utilization is strongly guided by rational considerations. This is confirmed by the smaller subsample of ad-hoc mixes in change management which represent the anti-pole of rational design, i.e. realistic evolution. Hence, the use of communication instruments in change management is predominantly guided by the model of bounded rationality.

Beyond the evaluation of correlations between several context factors and the mix index of communication instruments, it is a matter of interest how the context variables are related to each other. Therefore, factor analysis was conducted as a method to discover underlying

Table 4. Component diagram (rotated component matrix)

	Component		
	1	**2**	**3**
Mix index	0.562		0.473
Occupation		0.778	
Number of projects		−0.822	
Industry		0.356	
Employees affected	0.805		
Project manpower	0.703		
Interaction			−0.711
Change categories	−0.314		0.559

Note: extraction method: principal component analysis. Rotation method: Varimax with Kaiser-normalization, explained variance: 53.1%. The results of the rotated component matrix are considered.

Factor 1 (Project size): mix index, employees affected, project manpower
Factor 2 (Change expertise): occupation, number of projects
Factor 3 (Evaluation): mix index, interaction

factor structures. The factor analysis results in a model with three components (see Table 4) which account together for an explained variance of 53.1%.

The first factor – on which the variables mix index, number of employees affected and number of team members are loading – represents the project size. The structure of this component shows that large projects require electronic communication instruments and that these instruments are always used in combination with face-to-face communication. In turn, this structure also shows that the use of hybrid media concepts is not based on individual media preferences of the change managers or the employees affected. The application of hybrid communication concepts is rather driven by project requirements – in particular by the project size – and thus aims to compensate the weaknesses of the several communication instruments (see Fig. 1).

The second factor (change expertise) – consisting of the variables occupation and number of change projects – does not contain the mix index. The structure of this factor is plausible: the occupation of the change managers affects the number of projects managed. For example, consultants are "full-time" change managers and thus typically have ample change experience, while employees in a manufacturing company are not so well-experienced in change management.

The third factor (evaluation) – consisting of the assessment of the interaction between face-to-face communication and electronic media as well as the mix index – does not deliver an explanation for the use of hybrid media concepts as obvious as the first factor. The negative correlation of the two variables (interaction and mix index) has to be explained by influencing factors which were not covered by the survey. On the one hand, this correlation can be explained by barriers to the use of hybrid media concepts. On the other hand, an aspect of dynamics can be held responsible for this phenomenon: the biggest portion (204 persons;

87.6%) of the respondents assesses the relationship as crowding-out between face-to-face communication and electronic media. More than half of these 204 respondents already use diversified media mixes. The statement that the two groups of instruments crowd each other out can derive from the assumption that there will be a migration process from face-to-face communication to electronic media over time, and thus a step-by-step substitution of old instruments by new media. This interpretation gets further support by the respondents' opinion towards the development of the web 2.0 percentage in change management. While the majority of respondents (64.9%) estimate the current percentage of web 2.0 media application in change communication to be under 10%, 82% expect this share to rise in the future. That means, the vast majority of the surveyed change managers predicts an increasing importance of web 2.0 media, and thus of electronic media, in change management.

5. Hybrid learning: blended concepts in higher education

To collect evidence on the status quo of the integration of blended learning in higher education, the Department of Organizational Design and Behavior at Stuttgart University conducted an online survey "Blended Learning@University" from May to July 2008. More than 200 teachers (N = 200) participated in the survey, of which two thirds work for a German university and one third work for institutions in other European and Non-European countries. The vast majority of participants (76%) are employed at a public university and 10% at a private university. Teachers from technical universities are represented by 6%, teachers from universities of applied sciences and universities of cooperative education by 5% and 1% respectively. Participants were mainly recruited from business administration and information management/computer sciences. The focus of the survey on these fields of study is due to their affinity to electronic media and innovative instruments in higher education. Information management as well as business administration have often been pioneers in this area. Some of the specific research objects (e.g. web 2.0, computer-supported cooperative work – CSCW, learning content management systems – LCMS) of information management and computer sciences can also be applied in academic teaching in these disciplines, quite often for the sake of transfer of results into research projects. Thus, it is likely that these academic fields represent sources for good practices of blended learning.

 The empirical study Blended Learning@University investigates several different aspects of the use of blended learning in university teaching. Firstly, the survey concentrates on the degree of integration of blended learning in university teaching. Then, the surveyed university teachers were asked for their assessments of the performance of blended learning. Furthermore, the survey investigated different aspects of infrastructure. The analysis of infrastructure supports the identification of performance drivers for blended learning in university teaching. Such performance enhancing factors could be either a) the deployment of certain infrastructures mentioned above or b) improved embeddedness of blended learning in higher education. The embeddednes refers to the depth to which blended learning is embedded in higher education. The highest level of embeddedness is obtained when blended learning is used as an integrated concept for a program of study. A medium level of embeddedness is

obtained when blended learning is used in some courses, and the lowest level of embedded-ness is represented when blended learning concepts are applied in only one pilot course.

From a quantitative point of view (proportions), classroom teaching is still dominant: for 85% of the participants, e-learning represents at most 30% of their teaching. In 2004, the "Studies in the Context of the E-learning Initiative" (PLS Ramboll Management 2004: 62 et seqq.) provided similar results. Apparently, no further substitution of classroom teaching by e-learning has taken place.

More interesting than the mere quantitative incidence is what learning forms are combined and how the combination takes place (coupling). On the one hand, it is important how strongly the combined forms differ from each other (diversity) because this determines the need for integration. On the other hand, the patterns of coupling, i.e. the blending forms, are focused. Besides the diversity between the learning forms, the blending form – as a measurement for the closeness of the coupling between e-learning and classroom teaching – is the other determinant for integration.

According to the results of the survey, the support of classroom teaching via the download of teaching materials represents a widely used combination. This download opportunity is practically combined with all classroom teaching forms that were subject to the survey. The survey reveals only a few other typical combinations of learning forms that are used relatively frequently (from 19% to 31%), e.g. the enrichment of several classroom teaching forms with internet forums or chats. These highly interactive communication and learning forms are not only combined with classroom teaching forms that lack interactivity (e.g. lectures); they are also used in conjunction with workshops, seminars and case study work which bear a considerable degree of interactivity themselves. In principle, such combinations only lead to redundancy. Although internet forums and chats offer temporal and spatial flexibility to learners and teachers, they do not provide additional didactic opportunities when combined with. Merely combinations consisting of lectures and web-based/computer-based trainings, which are used frequently by 22% and 16%, bring together two genuinely diverse learning forms in a didactically productive way. In these teaching arrangements, students can act as consumers of learning content during lectures, and they can expand and deepen their knowledge in self-managed learning processes using the e-learning trainings. In summary, in higher education there still seems to be a lack of systematic blending which productively combines diverse learning forms with the aim to weakness compensation and strength bundling in order to create synergies.

As mentioned above, the blending forms can be differentiated depending on the degree of redundancy between the combined learning forms. Redundancy, in turn, results in costs for the university. For example, e-learning forms offered additionally to classroom teaching (e.g. to reach students during their stay abroad) provide a higher degree of individualization, but they also create the need for a doubling of learning content which makes them cost-intensive. The requirement for a standardization across e-learning and classroom teaching forms (e.g. with respect to layout and didactics) even intensifies this cost problem. Hence, it is not surprising that this blending form is used frequently only by ten percent of the participants. On the other hand, there are blending forms that are based on decoupling of e-learning and classroom teaching. This blending form is used, for example, when different learning forms are

used for different learning contents. It generates lower costs, but at the same time it provides less potential with respect to individualizing learning processes because such decoupling lacks the opportunity for spatial and temporal virtualization. Such blending forms are used relatively frequently in higher education: 40% of the surveyed university teachers use different learning forms depending on the learning phase, and 37% depending on the learning content. The least potential is in a blending form that can be considered "pseudo blending" since it does not represent a didactic concept: the administration of classroom teaching with e-learning instruments, like, for example, the provision of tools to enroll online for classroom teaching and to inform on schedules. This pseudo blending is used most frequently (66%) by the participants. Thus, most of the surveyed university teachers base their teaching mainly on classroom activities while they use e-learning solely for the administration of learning processes.

The study investigated the performance of blended learning on the basis of several criteria. The direct performance impacts of new learning forms in university teaching are the advantages (see Table 5) and disadvantages (see Table 6) of e-learning. In detail, the participants were asked for their opinion towards the following criteria:
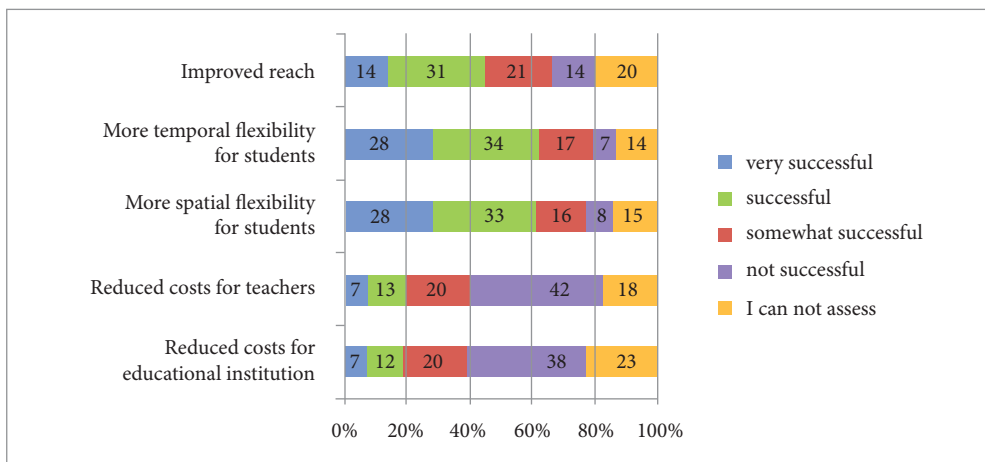
Advantages of e-learning
- improved reach (more students, independent from the location of the university),
- temporal and spatial flexibility (studying "anytime" and "anyplace"),
- reduced opportunity costs (via reduced classroom time) and travel costs for teachers,
- reduced costs for universities.
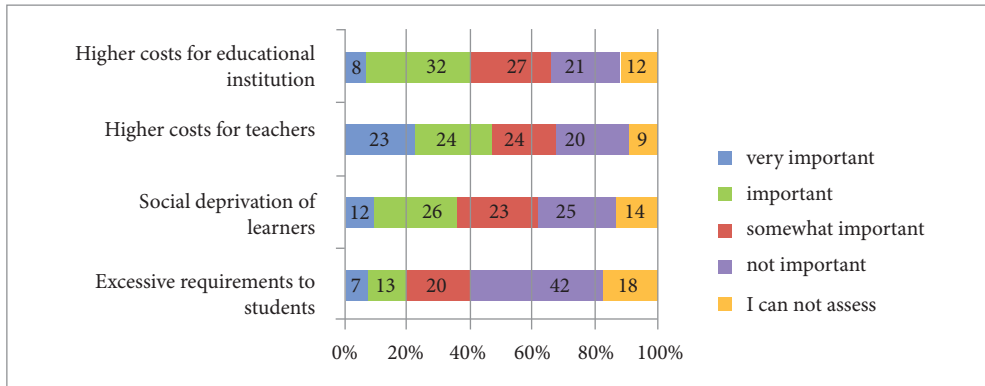
Disadvantages of e-learning
- higher acquisition and production costs (for teaching materials) for teachers and university (hardware, software, IT trainings),

Table 5. Advantages of e-learning in higher educatio

N = 200

Table 6. Disadvantages of e-learning in higher education
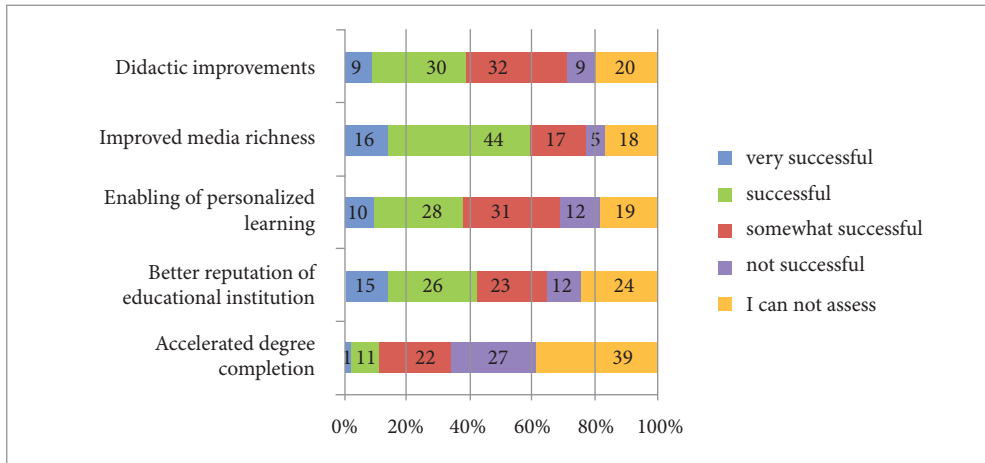

N = 200

- – deprivation of learners (social isolation, little group work, little interactivity),
- – excessive requirements to students' competencies (IT abilities, self-management competencies).

More than 60% of the respondents consider the effects of e-learning on temporal and spatial flexibility to be positive. 45% assume an improved reach through e-learning, but only 20% think that the costs for teachers and universities can be reduced by using electronic media. Thus, it is predominantly students that benefit from improvements in efficiency in terms of reduced costs through the use of e-learning. Neither universities nor teachers gain substantial improvements in terms of efficiency. On the contrary, the disadvantages in terms of higher production costs in e-learning are estimated as important for teachers and institutions. The increased costs for hardware are evaluated as a significant disadvantage by 40% of the respondents; the percentage for the personal costs for teachers is even higher (47%). But it has to be taken into consideration that all of the interrogated persons work as university teachers and are likely to assess their individual disadvantages higher than those of the students. There are also disadvantages for students resulting from the use of e-learning: at least, 38% of the participants consider the problem of social deprivation through virtual learning important.

Since the objective of blended learning is the mutual compensation of weaknesses and the creation of synergies between the combined learning forms, the commonly used assessment of advantages and disadvantages of e-learning is not sufficient. In fact, the combination of extremely diverse elements like e-learning and classroom teaching leads to interdependencies as well as compound effects. These effects cannot be assigned to one of the two different learning forms, they result from the blending (see Table 7).

Blending effects
- – didactic improvements (higher motivation, execution of didactic standards),
- – media richness (mix of different media and different methodologies),

Table 7. Advantages of blended learning in higher education

N = 200

- personalization (individualization of learning processes, self-managed learning),
- better reputation of university (awards, publicity through the internet),
- accelerated degree completion (because of temporal and spatial flexibility, self-management).

The opinions towards harmonic and synergetic interdependencies and compound effects between e-learning and classroom teaching are far from being enthusiastic (see Table 7): only 39% assume significant didactical improvements and even less (38%) of the participants think that the personalization of learning can be enhanced considerably by blended learning. At least, 41% expect blended learning to impact the reputation of the educational institution in a positive way. However, merely the effects on media richness are evaluated positively by a majority of the respondents.

From a (university) management perspective, the ultimate objective of investigating blended learning is the discovery of performance drivers, i.e. determinants that affect the effectiveness and efficiency of blended learning and therefore should be in the focus of management activities. As mentioned above, these determinants are either related to the embeddedness of blended learning or to certain infrastructural aspects. Furthermore, the interrelations between embeddedness and infrastructure have to be clarified, since such interdependencies could possibly help optimize both the current level of integration and the infrastructural instruments deployed.

First, relationships between the sectors of infrastructure and the performance of blended learning in higher education were examined by correlation analysis.

When analyzing the correlations between infrastructure and performance of blended learning, the first, rather surprising result of correlation analysis was the fact that there are only a relatively small number of statistically significant correlations among the numerous

infrastructure and performance variables. There is a positive significant correlation between the voluntary use of e-learning and cost disadvantages for the university. Similar to the increased distribution costs in brick & click companies, the free choice for students with respect to the use of e-learning creates redundancy costs because an additional channel for the learning contents has to be established and many learning contents have to be produced twice (for the two respective channels). However, with a correlation coefficient of 0.288 the correlation must not be overrated: such disadvantages can probably be balanced by other advantages that result from providing parallel learning channels, like, for example, the higher degree of personalization. Especially the deployment of more sophisticated IT systems for the support of blended learning is capable of enhancing learning effectiveness. The use of learning content management systems correlates positively with the factors media richness and personalization. The investments in such sophisticated and integrated tools is likely to foster effectiveness more than, for example, the use of websites and download materials in e-learning. Their use does not correlate significantly with learning performance. Another IT tool, Wiki, – which is technically quite easy to handle and can yet be called sophisticated (in terms of enabling social learning) – bears a significant positive correlation with the factor "improved reach". Wikis are able to approximate participative face-to-face collaboration among students in teams (e.g. in seminars and workshops) in a virtual environment. Thereby, they provide the possibility of team working and learning even for those students who are not on campus. Thus, blended learning is likely to deliver improved results with respect to learning effectiveness as long as it is supported with integrated and collaborative learning environments like LCMS and Wikis.

In a second step, the relationships between embeddedness and the performance factors were checked for significant correlations. The correlation analysis discloses that almost all performance factors correlate at a high significance with the embeddednes of blended learning in higher education.

6. Conclusions

The survey among change management experts shows that hybrid media concepts are indeed widely-used in change communication but their potential is currently not utilized sufficiently. Although the experts assume a harmonic relationship between new media and face-to-face communication, a number of situational context restrictions in the application of communication instruments constrain the performance of hybrid media concepts. Furthermore, the survey shows that the configuration of media mixes is not primarily determined by personal preferences of the change managers (like, for example, an affinity to technology or tendencies towards familiar instruments). They rather represent task-driven patterns of media utilization, i.e. their deployment mainly depends on context factors like the number of communication partners involved.

The results of the international survey among university teachers show that the majority of academic teachers also use hybrid media concepts in terms of blended learning in higher education. However, the performance potential of hybrid media concepts is not exploited

in this application field either. The survey reveals that the main driver of blended learning performance is its embeddedness in higher education, which means that integrated blended programs of study deliver the best results. According to the surveyed university teachers, however, blended learning is currently predominantly used in single courses, but not as a program of study and thus falls short of the expectations with respect to performance enhancements in higher education.

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**HIBRIDINĖS ŽINIASKLAIDOS MODELIŲ TAIKYMO KONCEPTUALI
IR EMPIRINĖ ANALIZĖ**

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Santrauka

Jau gana seniai hibridinė žiniasklaida, t. y. tiesioginio bendravimo priemonės ir elektroninė žiniasklaida, paplitusi daugelyje veiklos sričių. Įvairūs hibridinės žiniasklaidos priemonių deriniai dažnai naudojami marketinge, mažmeninėje prekyboje, virtualiųjų įmonių veikloje, vidaus komunikacijos procesuose, žmogiškųjų išteklių plėtros ir aukštojo mokslo srityse. Derinant dvi ar daugiau žniasklaidos priemones, sustiprinami jų privalumai ir kompensuojami trūkumai. Taigi hibridinė žiniasklaida yra veiksmingesnė. Tačiau iki šiol trūksta mokslinės diskusijos apie hibridinės žiniasklaidos koncepcijas, jų praktinį taikymą.

Taigi nėra aišku, kokiu mastu naudojamos hibridinės žiniasklaidos priemonės ir kas yra jų naudotojai. Straipsnyje pateikiamos hibridinės žiniasklaidos koncepcijos ir jų praktinio taikymo pavyzdžiai vidaus ryšių valdymo ir aukštojo mokslo srityse.

Reikšminiai žodžiai: hibridinės žiniasklaidos koncepcijos, hibridinio valdymo koncepcijos, mišrus mokymasis, elektroninis komunikavimas, pokyčių valdymas, e. mokymasis, aukštasis mokslas.

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