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STIMULI IN THE ADAPTATION PROCESS TO DIGITAL TRANSFORMATION AMONG UNIVERSITY FACULTY MEMBERS: INTERNAL AND EXTERNAL DRIVERS OF TECHNOLOGICAL CHANGE

Abstract

This study examined internal and external stimuli influencing faculty adaptation to digital transformation in higher education settings. The study applies cross-sectional survey of 154 faculty members from Kazakhstani universities used validated instruments. Results revealed a clear stimulus hierarchy: internal stimuli (intrinsic motivation, self-efficacy) explained 21% of unique variance in technology acceptance, compared to 4% for organizational support and less than 1% for external negative stimuli. Age significantly moderated these relationships. Internal stimuli were stronger predictors for younger faculty ($\beta = 0.42$ vs. 0.18), while organizational support was more critical for older faculty ($\beta = 0.34$ vs. 0.08). External pressure showed harmful effects only among senior faculty members ($\beta = -0.31$). The cluster analysis that identified four faculty typologies characterized by distinct stimulus-response profiles. These findings suggest that successful digital transformation requires age-differentiated, autonomy-supportive institutional approaches rather than uniform mandates. The study findings can help to promote digital transformation across higher education institutions more effectively.

Keywords: digital transformation, stimuli, higher education, faculty motivation, technology acceptance, organizational support.

Introduction

The digital transformation of higher education represents one of the most significant organizational changes facing universities worldwide. This transformation extends beyond the mere adoption of new technologies to encompass fundamental shifts in pedagogical practices, professional identities, and institutional cultures [1, 2]. While considerable research has examined barriers to technology adoption among educators, comparatively less attention has been devoted to understanding what stimulates successful adaptation – the internal and external drivers that motivate faculty members to genuinely embrace technological change rather than simply comply with institutional mandates [3].

The urgency of understanding faculty adaptation has intensified in recent years. The COVID-19 pandemic forced unprecedented rapid digitalization of higher education, exposing significant variability

in faculty technological readiness and adaptation capacity. While some faculty members transitioned seamlessly to online teaching, others struggled significantly, and post-pandemic research suggests that many faculty have reverted to pre-pandemic practices despite institutional investments in digital infrastructure. This variability raises fundamental questions about what drives sustained adaptation versus temporary compliance – questions that require systematic investigation of the stimuli that promote genuine pedagogical transformation.

The distinction between adoption and adaptation is crucial for understanding faculty responses to digital transformation. Technology adoption refers to the decision to begin using a new technology, often measured as a discrete event or behavioral intention. Adaptation, by contrast, encompasses the ongoing process of integrating technology into existing practices, modifying one's approach based on experience, and ultimately transforming one's professional identity to incorporate technological competence as a core element. While adoption may occur in response to external mandates or momentary enthusiasm, sustained adaptation requires deeper engagement with the change process – engagement that must be stimulated and maintained over time.

Faculty members occupy a pivotal position in institutional digital transformation efforts. Unlike administrative processes that can be mandated and monitored, pedagogical practices occur largely within the autonomy of individual classrooms and courses. The success of institutional digitalization initiatives therefore depends fundamentally on faculty members' willingness to adapt their teaching practices – a willingness that cannot be compelled but must be cultivated through appropriate stimuli. Understanding what drives faculty adaptation is thus not merely an academic question but a practical imperative for higher education administrators seeking to optimize digital transformation investments. Self-Determination Theory (SDT) provides a comprehensive framework for understanding how different types of stimuli influence human motivation and behavior [4, 5]. At the core of SDT is the distinction between autonomous motivation – engaging in activities because they are inherently interesting, personally valuable, or aligned with one's identity and controlled motivation – engaging in activities due to external pressure, internal compulsion, or fear of negative consequences. Research consistently demonstrates that autonomous motivation produces superior outcomes across multiple domains, including deeper engagement, greater persistence, enhanced creativity, and improved psychological wellbeing [5]. SDT further differentiates types of extrinsic motivation along a continuum of internalization. External regulation represents the least autonomous form, where behavior is controlled entirely by external contingencies such as rewards or punishments. Introjected regulation involves partial internalization, where behavior is driven by internal pressure such as guilt, shame, or ego-involvement. Identified regulation occurs when individuals consciously value and accept the importance of a behavior, even if it is not inherently enjoyable. Finally, integrated regulation represents full internalization, where the behavior becomes part of one's identity and values system. Research consistently shows that more autonomous forms of motivation (identified and integrated regulation) produce outcomes similar to intrinsic motivation, while controlled forms (external and introjected regulation) produce inferior outcomes [5].

Applied to digital transformation, SDT suggests that faculty members who adopt new technologies primarily due to administrative mandates or fear of negative evaluation (external regulation) may comply superficially but are unlikely to engage in the deep learning and practice transformation that characterizes genuine adaptation. Faculty members who adopt technology due to internal pressure or desire to avoid feeling inadequate (introjected regulation) may show initial engagement but are vulnerable to burnout and disengagement. In contrast, faculty members who genuinely value digital pedagogy as important for student learning (identified regulation) or who find technological exploration inherently satisfying (intrinsic motivation) are more likely to persist through difficulties and achieve sustained adaptation [6].

The role of self-efficacy in technology adoption has been well-established in the research literature. Self-efficacy refers to individuals' beliefs about their capability to successfully perform specific behaviors [8]. In the context of digital transformation, faculty with high technology self-efficacy believe they can master new tools, troubleshoot problems, and integrate technology effectively into their teaching. Research consistently demonstrates that self-efficacy predicts technology adoption intentions and behaviors, mediates the effects of training and experience, and buffers against technology

anxiety. Importantly, self-efficacy is malleable – it can be enhanced through mastery experiences, vicarious learning, verbal persuasion, and attention to physiological states.

Organizational support represents a critical external stimulus for faculty adaptation. Perceived organizational support refers to employees' beliefs about the extent to which their organization values their contributions and cares about their wellbeing. In digital transformation contexts, organizational support encompasses multiple dimensions: technical support (responsive IT assistance, adequate equipment), pedagogical support (instructional design consultation, teaching-focused training), temporal support (time allocation for learning and experimentation), and emotional support (acknowledgment that adaptation is challenging, patience with difficulties). Research suggests that organizational support operates through multiple mechanisms: it directly facilitates skill development, it signals institutional commitment that encourages reciprocal effort, and it may buffer against the negative psychological effects of adaptation challenges.

Age has emerged as one of the most consistent predictors of technology attitudes and adoption in both general and educational populations [13, 14]. Older adults tend to report lower technology self-efficacy, higher technology anxiety, and greater resistance to change compared to younger adults. Multiple explanations have been proposed for these differences. Generational explanations emphasize that older adults did not grow up with digital technology and may therefore lack the intuitive familiarity that younger adults possess. Cognitive explanations suggest that age-related changes in processing speed, working memory, and learning capacity may make technology adoption more effortful for older adults. Career-stage explanations note that senior faculty have established successful practices over decades and may reasonably question whether the costs of changing these practices are justified by potential benefits.

However, these age differences may not simply reflect lower ability among older faculty but rather differential responsiveness to different types of stimuli. Younger faculty, who may view technological competence as integral to their professional identity and who possess high baseline self-efficacy, may require minimal external stimulation to pursue adaptation. For these faculty, intrinsic curiosity and professional values may be sufficient drivers. Older faculty, by contrast, may require stronger organizational support to overcome higher baseline anxiety and lower self-efficacy. Moreover, older faculty may be more sensitive to the autonomy-undermining effects of mandates and pressure, having developed strong professional identities and expectations of respect over their careers. Understanding how stimulus effectiveness varies by age could inform more targeted and effective intervention strategies.

This study addresses these questions by examining how internal stimuli (intrinsic motivation, self-efficacy, identified regulation) and external stimuli (organizational support, external positive motivation, external negative motivation) influence faculty adaptation to digital transformation in Kazakhstani higher education. The Kazakhstani context is particularly relevant given the country's strategic emphasis on educational modernization and digital transformation, combined with a faculty workforce that spans generations with very different relationships to digital technology.

Specifically, we investigate the relative effectiveness of different stimulus types, the moderating role of age, the potential buffering effect of organizational support against negative stimuli, and the existence of distinct faculty typologies characterized by different stimulus-response profiles. The study employs validated Russian-language instruments to ensure measurement validity in this context.

Research Hypotheses:

H1: Internal stimuli will show stronger associations with adaptation outcomes than external stimuli.

H2: Positive external stimuli (support) will be more effective than negative external stimuli (pressure).

H3: Stimulus effectiveness will vary by age: (a) internal stimuli stronger for younger faculty; (b) organizational support stronger for older faculty; (c) negative stimuli more harmful for older faculty.

H4: Organizational support will mediate negative stimulus effects.

H5: Self-efficacy will moderate positive stimulus effectiveness.

H6: Distinct stimulus profiles will characterize different faculty typologies.

Materials and methods

The sample consisted of 154 faculty members from public (47.4%), private (27.9%), and national research universities (24.7%) in Kazakhstan.

Table 1 – Demographic characteristics (N = 154)

Characteristic	n	%
Gender		
Female	93	60.4
Male	61	39.6
Age group		
25–34 years	27	17.5
35–44 years	50	32.5
45–54 years	38	24.7
55–64 years	29	18.8
65+ years	10	6.5
Academic position		
Lecturer	18	11.7
Senior Lecturer	44	28.6
Associate Professor	52	33.8
Professor	40	26.0
Note: Complied by the authors.		

All instruments used in this study are in Russian language, including standardized instruments with validated Russian adaptations and author-developed scales created specifically for this research. Academic Motivation Scale (AMS). The Russian adaptation by Gordeeva and Sychev [7] assessed intrinsic motivation (12 items) and identified regulation (4 items) on a 7-point scale (α = .85–.89); General Self-Efficacy Scale (GSES). The Russian adaptation by Romek [8] measured generalized self-efficacy with 10 items on a 4-point scale (α = .85); Professional Motivation Methodology (Zamfir-Rean). This Russian methodology [9] assessed internal motivation, external positive motivation, and external negative motivation (12 items total, 5-point scale); Spielberger State-Trait Anxiety Inventory (STAI). The Russian adaptation by Khanin [10] measured state and trait anxiety (40 items, 4-point scale); Maslach Burnout Inventory (MBI). The Russian adaptation by Vodopyanova [11] assessed burnout dimensions (22 items, 7-point scale); Perceived Stress Scale (PSS-10). The Russian validation by Ababkov et al. [12] measured perceived stress (10 items, 5-point scale); Organizational Support Scale. Developed in Russian for this study, 16 items measuring technical support, pedagogical support, time allocation, and emotional support on a 7-point Likert scale (α = .87); Technology Acceptance Scale. Developed in Russian for this study, 16 items measuring perceived usefulness (6 items), perceived ease of use (6 items), and behavioral intention (4 items) on a 7-point Likert scale (α = .89); Digital Competence Self-Assessment. Developed in Russian for this study, 12 items measuring self-reported competence in educational technology use on a 5-point scale (α = .84).

Participants completed an anonymous online survey in Russian (25–35 minutes). Analyses were conducted using R version 4.3.3: (1) descriptive statistics; (2) Pearson correlations; (3) hierarchical regression; (4) moderation analysis (Age × Stimulus); (5) mediation analysis (bootstrapping, 5000 resamples); (6) k-means cluster analysis.

Results and discussion

Internal stimuli showed consistent positive correlations with adaptation outcomes (r = .29 to .65) and negative correlations with anxiety and burnout. External negative motivation showed the opposite pattern, with strong negative correlations with adaptation (r = −.36 to −.42) and positive correlations with psychological distress.

Table 2 – Correlations between stimuli and adaptation outcomes

Variable Internal Stimuli	Tech Accept	Digital Comp	State Anxiety	Burnout
Intrinsic motivation	.54***	.58***	−.42***	−.38***
Identified regulation	.32***	.29***	−.08	−.11
General self-efficacy	.61***	.65***	−.55***	−.44***
Internal prof. motivation	.48***	.51***	−.39***	−.35***
External Stimuli				
Organizational support	.43***	.41***	−.31***	−.28***
External positive mot.	.21**	.24**	−.06	−.08
External negative mot.	−.36***	−.42***	.41***	.45***
Note: **p < .01, ***p < .001. Complied by the authors.				

Internal stimuli explained 21% of variance beyond demographics, organizational support added 4%, and external negative motivation added only 1% (non-significant). This strongly supports H1 and H2.

Table 3 – Hierarchical regression predicting technology acceptance

Step / Predictor	β	ΔR^2	Cumulative R^2
Step 1: Demographics		.34***	.34
Age	−0.57***		
Gender	0.05		
Step 2: Internal Stimuli		.21***	.55
Intrinsic motivation	0.26***		
General self-efficacy	0.29***		
Identified regulation	0.09		
Step 3: External Positive		.04**	.59
Organizational support	0.19**		
External positive mot.	0.07		
Step 4: External Negative		.01	.60
External negative mot.	−0.09		
Note: **p < .01, ***p < .001. Compiled by the authors.			

All H3 sub-hypotheses were supported. Intrinsic motivation was more effective for younger faculty, organizational support was critical for older faculty, and external negative stimuli harmed only older faculty.

Table 4 – Age moderation of stimulus-outcome relationships

Interaction	β	p	Simple Slopes
			Age 30
Intrinsic Mot × Age	0.18	.009	β = 0.42***
Self-Efficacy × Age	0.11	.089	β = 0.35***
Org Support × Age	−0.21	.004	β = 0.09
Ext Negative × Age	−0.16	.022	β = −0.07
Note: *p < .05, **p < .01, ***p < .001. Compiled by the authors.			

Organizational support partially mediated negative stimulus effects (H4 supported). The mediation was significant only for older faculty.

Table 5 – Organizational support as mediator of external negative stimuli effects

Path	Effect	95% CI
Total effect (c)	−0.36***	
Direct effect (c')	−0.24**	
Indirect effect (ab)	−0.12*	[−0.19, −0.06]
By Age Group		
Faculty under 35	−0.06	[−0.13, 0.01]
Faculty 55+	−0.19***	[−0.29, −0.10]
Note: *p < .05, **p < .01, ***p < .001. CI = bootstrapped confidence interval. Compiled by the authors.		

The interaction between intrinsic motivation and self-efficacy predicted technology acceptance (β = 0.15, p = .024). Intrinsic motivation was a stronger predictor for high self-efficacy faculty (β = 0.41) than low self-efficacy faculty (β = 0.18), supporting H5.

K-means cluster analysis identified four faculty typologies explaining 58.6% of variance.

Table 6 – Faculty typologies: stimulus profiles and characteristics

Cluster	n (%)	Mean Age	Intrinsic Mot	Self-Efficacy	Ext Neg Mot	Tech Accept
Digital Leaders	24 (15.6%)	31.2	5.42 (high)	34.8 (high)	2.91 (low)	5.18 (high)
Digital Enthusiasts	42 (27.3%)	38.7	4.56 (above avg)	30.2 (above avg)	3.24 (avg)	4.32 (above avg)
Pragmatic Adapters	46 (29.9%)	49.4	3.89 (avg)	27.5 (avg)	3.78 (above avg)	3.56 (avg)
Resistant Skeptics	42 (27.3%)	58.6	2.94 (low)	22.1 (low)	4.51 (high)	2.68 (low)
Note: Compiled by the authors.						

Distinct patterns emerged (H6 supported): Digital Leaders showed ceiling effects; Digital Enthusiasts responded to recognition; Pragmatic Adapters required organizational support; Resistant Skeptics were most harmed by external pressure.

Table 7 – Within-cluster stimulus effectiveness (correlation with technology acceptance)

Stimulus	Digital Leaders	Digital Enthusiasts	Pragmatic Adapters	Resistant Skeptics
Intrinsic motivation	.19	.36*	.31*	.14
Self-efficacy	.22	.38*	.42**	.35*
Organizational support	.24	.33*	.48***	.41**
External positive	.08	.42**	.24	.12
External negative	−.16	−.21	−.29*	−.52***
Note: *p < .05, **p < .01, ***p < .001. Compiled by the authors.				

The present study examined the role of internal and external stimuli in faculty adaptation to digital transformation in higher education. Results demonstrate a clear and consistent hierarchy of stimulus effectiveness that has important implications for both theory and practice. Internal stimuli – specifically intrinsic motivation and general self-efficacy – explained substantially more variance in adaptation outcomes (21%) than external positive stimuli such as organizational support (4%) or external negative stimuli such as mandates and pressure (<1%). This pattern strongly supports Self-Determination Theory predictions that autonomous motivation produces superior behavioral and psychological outcomes compared to controlled motivation [4, 5]. The findings reveal that not all external stimuli operate equivalently. Organizational support, while contributing modest unique variance to adaptation outcomes, emerged as a consistently positive factor across all analyses. In contrast, external negative motivation – characterized by fear of criticism, avoidance of penalties, and pressure from administration – showed either null or negative relationships with adaptation outcomes.

Most critically, when internal stimuli and organizational support were statistically controlled, external negative stimuli contributed virtually no unique variance to adaptation, suggesting that their bivariate correlations with outcomes reflect shared variance with other factors rather than direct causal effects. Age emerged as a critical moderator of stimulus-outcome relationships, fundamentally reshaping how we should conceptualize faculty responses to digital transformation initiatives. Younger faculty members (aged 25–34) effectively translate intrinsic motivation into adaptation outcomes, showing strong positive relationships between internal stimuli and technology acceptance. For these faculty members, who have grown up with digital technology and may view technological competence as integral to their professional identity, internal motivation appears sufficient to drive adaptation. External support, while not harmful, adds relatively little beyond what internal motivation already provides. The pattern reverses dramatically for senior faculty members (aged 55 and older). For this population, organizational support becomes the critical factor, showing substantially stronger relationships with adaptation outcomes than among younger colleagues. Most critically, external negative stimuli – mandates, monitoring, pressure – showed harmful effects only among senior faculty, with significant negative relationships with technology acceptance that were absent among younger faculty. This finding suggests that coercive implementation approaches are not merely ineffective but actively counterproductive precisely among the population that most needs support for successful adaptation. The present findings make several contributions to theoretical understanding of faculty adaptation to digital transformation.

First, the study extends the application of Self-Determination Theory to higher education technology adoption by demonstrating that the theory's core predictions – regarding the superiority of autonomous over controlled motivation – hold across diverse faculty populations and institutional contexts. The magnitude of difference between internal and external stimulus effectiveness (21% vs. 4% vs. <1% unique variance) provides strong evidence for SDT's relevance to understanding faculty technology adoption.

Second, the study advances understanding of age differences in technology adoption by identifying the mechanism underlying these differences. Previous research has consistently documented that older adults show lower technology self-efficacy, higher technology anxiety, and lower technology adoption rates [13, 14, 15]. However, these findings have often been interpreted as reflecting cognitive decline, reduced learning capacity, or simple generational unfamiliarity with technology. The present findings suggest an alternative interpretation: older faculty may not be less capable of adaptation but rather differently responsive to adaptation stimuli. Where younger faculty thrive on autonomy and intrinsic interest, older faculty require stronger organizational support and are more vulnerable to the demotivating effects of external pressure.

Third, the mediation analysis revealed that organizational support partially buffers the negative effects of external pressure on adaptation outcomes, but only for older faculty. This finding has important theoretical implications. It suggests that organizational support operates not merely as a direct facilitator of adaptation but also as a protective factor that shields faculty from the psychological costs of coercive implementation approaches. For institutions that must implement mandates, simultaneous investment in robust support infrastructure may mitigate – though not eliminate – the negative effects of pressure-based approaches.

Fourth, the identification of four distinct faculty typologies – Digital Leaders, Digital Enthusiasts, Pragmatic Adapters, and Resistant Skeptics – advances understanding of faculty heterogeneity in technology adoption. These typologies are characterized not merely by different levels of technology acceptance but by qualitatively different stimulus-response patterns. Digital Leaders show ceiling effects and respond primarily to autonomy; Digital Enthusiasts respond to recognition and growth opportunities; Pragmatic Adapters require practical demonstration of benefits and reliable support; Resistant Skeptics are most harmed by external pressure and most helped by patient, peer-based support. This typology suggests that one-size-fits-all approaches to stimulating faculty adaptation are likely to be suboptimal.

The findings have substantial implications for higher education administrators and policymakers seeking to facilitate faculty adaptation to digital transformation. The most fundamental implication is that mandate-centered approaches are unlikely to produce genuine adaptation. While mandates may produce compliance – faculty may technically use required systems and meet minimum requirements –

they do not produce the deep engagement, skill development, and practice transformation that characterizes genuine adaptation. The finding that external negative stimuli contributed less than 1% unique variance to adaptation outcomes when other factors were controlled suggests that pressure-based approaches add virtually nothing beyond what intrinsic motivation and organizational support already provide.

Instead, institutions should prioritize the cultivation of internal motivation and the provision of robust organizational support. For internal motivation, this means creating conditions that support faculty autonomy (allowing choice in which technologies to adopt and how to integrate them), competence (providing training that builds confidence), and relatedness (fostering communities of practice around educational technology). For organizational support, this means investing in responsive technical assistance, pedagogical consultation, time allocation for learning and experimentation, and emotional acknowledgment that adaptation is challenging.

The age moderation findings suggest that intervention strategies should be differentiated by career stage. For younger faculty, the primary strategy should be providing autonomy, innovation opportunities, and leadership roles in technology initiatives. These faculty members are likely to adapt successfully with minimal intervention, and excessive oversight may actually undermine their intrinsic motivation. For mid-career faculty, recognition of their efforts and provision of advanced training opportunities may be most effective. For senior faculty, patient support, peer modeling (by faculty of similar age), ample time for learning, and explicit avoidance of mandate-based approaches are essential.

The cluster-specific findings provide additional guidance for targeted interventions. Digital Leaders (15.6% of sample) require minimal intervention and may serve effectively as peer mentors and innovation champions; the primary risk is constraining their exploration through overly restrictive policies. Digital Enthusiasts (27.3%) are well-positioned for peer mentoring roles and respond positively to recognition; institutions should leverage their enthusiasm while providing growth opportunities. Pragmatic Adapters (29.9%) require clear demonstration of practical benefits and reliable ongoing support; abstract appeals to innovation or student expectations are unlikely to be effective. Resistant Skeptics (27.3%) require the most careful handling: patient, individualized support from peers of similar age, explicit respect for their pedagogical expertise, and complete avoidance of pressure-based approaches.

Several limitations should be acknowledged when interpreting these findings. First, the cross-sectional design precludes definitive causal inferences. While the theoretical framework and analytical approach support directional interpretations, longitudinal research is needed to confirm that changes in stimuli produce changes in adaptation outcomes over time. Future studies should track faculty cohorts through digital transformation initiatives, measuring stimulus exposure and adaptation outcomes at multiple time points.

Second, all measures were self-reported, introducing potential common method variance and social desirability bias. Faculty may overreport intrinsic motivation or underreport technology anxiety. Future research should incorporate objective measures of technology use (e.g., learning management system analytics), peer ratings of digital competence, or behavioral indicators of adaptation.

Third, the sample was drawn from a single country (Kazakhstan), limiting generalizability to other cultural and institutional contexts. The post-Soviet higher education context may have distinctive features – including particular relationships between faculty and administration, specific generational experiences with technology, and unique institutional cultures – that shape stimulus-response patterns. Cross-cultural replication, particularly in Western European, North American, and East Asian contexts, is needed to assess the generalizability of the findings.

Fourth, while the author-developed scales demonstrated acceptable reliability, their validity requires further investigation. Future research should examine convergent and discriminant validity with established measures and assess measurement invariance across demographic groups.

Finally, the study examined adaptation stimuli at the individual level but did not assess institutional-level factors such as organizational culture, leadership style, or resource allocation. Future research should employ multilevel modeling to examine how institutional factors moderate the effectiveness of individual-level stimuli.

Conclusion

The digital transformation of higher education presents both opportunities and challenges for faculty members across all career stages. This study provides empirical evidence that successful adaptation to digital transformation depends more on internal stimuli – intrinsic motivation, self-efficacy beliefs, and internalized professional values – than on external pressures, mandates, or accountability mechanisms. The finding that internal stimuli explained five times more variance in adaptation outcomes than organizational support, and more than twenty times more variance than external negative stimuli, underscores the fundamental importance of autonomous motivation in driving genuine pedagogical transformation.

Perhaps more importantly, this study reveals that faculty members are not a homogeneous population with uniform responses to adaptation stimuli. Age emerged as a critical moderator, with younger and older faculty showing qualitatively different stimulus-response patterns. Younger faculty effectively translate intrinsic motivation into adaptation with minimal external support, while older faculty depend heavily on organizational support and are uniquely vulnerable to the demotivating effects of coercive approaches. The identification of four distinct faculty typologies – Digital Leaders, Digital Enthusiasts, Pragmatic Adapters, and Resistant Skeptics – further emphasizes that effective digital transformation strategies must be differentiated rather than uniform.

The practical implications of these findings are clear. Institutions seeking to promote faculty adaptation to digital transformation should invest in creating conditions that support autonomous motivation: faculty autonomy in technology choices, competence-building through effective training, and communities of practice that foster professional connection around educational technology. Simultaneously, institutions should provide robust organizational support – technical assistance, pedagogical consultation, time allocation, and emotional acknowledgment – particularly for mid-career and senior faculty.

What institutions should avoid is equally clear. Mandate-centered approaches that rely on external pressure, monitoring, and accountability are unlikely to produce genuine adaptation and may actively undermine adaptation among senior faculty. The finding that external negative stimuli showed harmful effects specifically among older faculty – the population often most in need of support – suggests that coercive approaches are not merely ineffective but counterproductive.

In conclusion, successful digital transformation in higher education requires a fundamental shift in institutional approach: from compelling compliance to cultivating commitment, from mandating behavior to supporting motivation, and from treating faculty as a uniform population to recognizing the diverse stimulus-response patterns that characterize different faculty segments. The investment required for such an approach – in training, support infrastructure, and patience – is substantial. But the alternative – superficial compliance without genuine transformation – represents a poor return on the considerable resources institutions invest in digital transformation initiatives.

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УНИВЕРСИТЕТ ОҚЫТУШЫЛАРЫНЫҢ ЦИФРЛЫҚ ТРАНСФОРМАЦИЯҒА БЕЙІМДЕЛУ ПРОЦЕСІНДЕГІ ЫНТАЛАНДЫРУШЫ ФАКТОРЛАР: ТЕХНОЛОГИЯЛЫҚ ӨЗГЕРІСТЕРДІҢ ІШКІ ЖӘНЕ СЫРТҚЫ ДРАЙВЕРЛЕРІ

Андатпа

Бұл зерттеуде жоғары білім беру жүйесінде профессор-оқытушылар құрамының цифрлық трансформацияға бейімделуіне әсер ететін ішкі және сыртқы ынталандырушы факторлар қарастырылды. Жұмыста валидацияланған құралдарды қолдана отырып, Қазақстан жоғары оқу орындарының 154 оқытушысына қималық (көлденең) сауалнама жүргізілді. Нәтижелер ынталандырушы факторлардың айқын иерархиясын көрсетті: ішкі ынталандырушы факторлар (ішкі мотивация, өзіндік тиімділік) технологияны қабылдаудағы бірегей дисперсияның 21%-ын түсіндірді, ал ұйымдық қолдау – 4%-ын, сыртқы негативті факторлар – 1%-дан азын түсіндірді. Жас осы өзара байланыстардың маңызды модераторы болды. Ішкі ынталандырушы факторлар жас оқытушылар үшін күштірек болжаушы болды (β = 0,42-ге қарсы 0,18), ал ұйымдық қолдау егде жастағы оқытушылар үшін маңыздырақ болды (β = 0,34-ке қарсы 0,08). Сыртқы қысым тек егде жастағы оқытушылар арасында ғана зиянды әсер көрсетті (β = −0,31). Кластерлік талдау «ынталандыру – жауап»

бейіндері әртүрлі оқытушылардың төрт типологиясын анықтауға мүмкіндік берді. Бұл нәтижелер табысты цифрлық трансформация біркелкі директивалық нұсқаулардың орнына жасына қарай сараланған, автономияны қолдайтын институционалдық тәсілдерді талап ететінін көрсетеді. Зерттеу нәтижелері жоғары оқу орындарында цифрлық трансформацияны тиімдірек ілгерілетуге ықпал ете алады.

Тірек сөздер: цифрлық трансформация, ынталандырушы факторлар, жоғары білім, оқытушылар мотивациясы, технологияны қабылдау, ұйымдық қолдау.

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СТИМУЛЫ В ПРОЦЕССЕ АДАПТАЦИИ К ЦИФРОВОЙ ТРАНСФОРМАЦИИ СРЕДИ ПРЕПОДАВАТЕЛЕЙ УНИВЕРСИТЕТОВ: ВНУТРЕННИЕ И ВНЕШНИЕ ДРАЙВЕРЫ ТЕХНОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ

Аннотация

В настоящем исследовании рассматривались внутренние и внешние стимулы, влияющие на адаптацию профессорско-преподавательского состава к цифровой трансформации в системе высшего образования. В работе применялся метод кросс-секционного (поперечного) опроса 154 преподавателей казахстанских вузов с использованием валидизированных инструментов. Результаты выявили четкую иерархию стимулов: внутренние стимулы (внутренняя мотивация, самоэффективность) объясняли 21% уникальной дисперсии в принятии технологий, тогда как организационная поддержка – 4%, а внешние негативные стимулы – менее 1%. Возраст выступал значимым модератором данных взаимосвязей. Внутренние стимулы являлись более сильными предикторами для молодых преподавателей ($\beta = 0{,}42$ против 0,18), в то время как организационная поддержка имела большее значение для преподавателей старшего возраста ($\beta = 0{,}34$ против 0,08). Внешнее давление оказывало негативное воздействие только среди преподавателей старшего возраста ($\beta = -0{,}31$). Кластерный анализ позволил выделить четыре типологии преподавателей, характеризующиеся различными профилями «стимул – реакция». Полученные результаты свидетельствуют о том, что успешная цифровая трансформация требует дифференцированных по возрасту институциональных подходов, поддерживающих автономию, а не единообразных директивных предписаний. Результаты исследования могут способствовать более эффективному продвижению цифровой трансформации в высших учебных заведениях.

Ключевые слова: цифровая трансформация, стимулы, высшее образование, мотивация преподавателей, принятие технологий, организационная поддержка.

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