

# **Statistical substantiation of the quality of training metrologists in the system of additional professional education**

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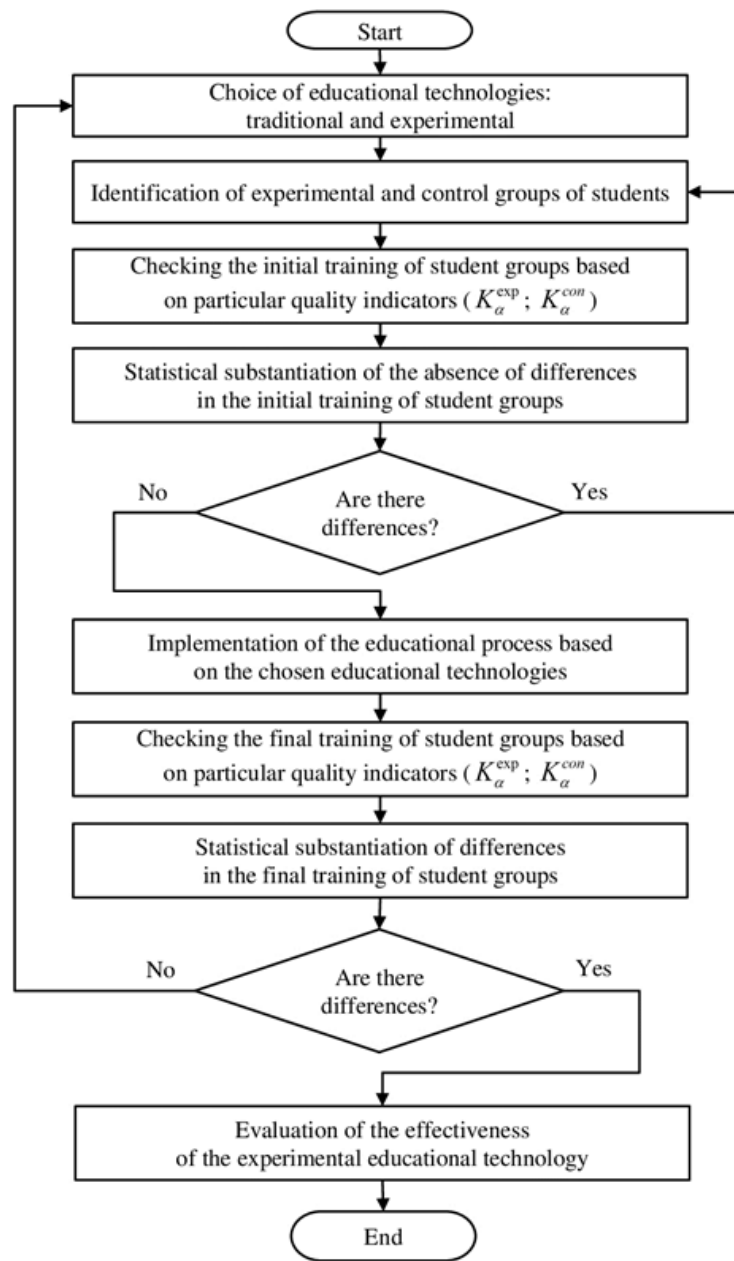
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# Abstract

The paper discusses the basics to ensure the quality of educational parameters of training engineering specialists, including the field of metrology, within additional professional education. The parameters of the educational quality that determine the effectiveness of this activity are identified. The emphasis is placed on the educational process parameter that has a direct impact on the quality of training students within additional professional educational programs, that is educational technology used in educational activities. Scientific papers are analyzed in the field of identifying an effective educational technology that ensures the quality of training students among other equal conditions. The problems are studied that are related to the choice to implement an effective educational technology in additional professional educational program. The relevance of statistical substantiation to apply an educational technology in educational activities is proved. The procedure for substantiating the quality (effectiveness) of the educational technology based on the use of statistical methods is proposed. The expediency of using statistical tools to confirm the quality of educational technology used in educational activities is argued.

# Procedure for substantiating the choice of an effective educational technology



## Results of evaluating the initial training of students in the experimental and control groups based on the identification of the level of knowledge acquisition $K_\alpha$

Level of knowledge	Experimental group, %	Control group, %
$0.9 \leq K_\alpha \leq 1$ «excellent»	21	28
$0.8 \leq K_\alpha < 0,9$ «good»	58	48
$0.7 \leq K_\alpha < 0.8$ «satisfactory»	21	24
$K_\alpha < 0.7$ «unsatisfactory»	–	–

### Indicators of preliminary testing of students in the control and experimental groups (table fragment)

Groups	Number of students	The number of correctly done tasks, $\alpha$					$K_\alpha$	$S^2$	$S$
		14	15	...	19	20			
Experimental	19	2	3	...	1	3	0.840	$8.77 \cdot 10^{-3}$	0.0937
Control	54	-	14	...	4	8	0.865	$6.91 \cdot 10^{-3}$	0.0831
$t = 0.659 < t_{1-0.05/2;71} = 1.666$									

## Results of evaluating the final training of students in the experimental and control groups based on the identification of the level of knowledge acquisition $K_\alpha$

Level of knowledge	Experimental group, %	Control group, %
$0.9 \leq K_\alpha \leq 1$ «excellent»	52	18
$0.8 \leq K_\alpha < 0,9$ «good»	44	39
$0.7 \leq K_\alpha < 0.8$ «satisfactory»	4	43
$K_\alpha < 0.7$ «unsatisfactory»	–	–

### Indicators of final testing of students in the control and experimental groups (table fragment)

Groups	Number of students	The number of correctly done tasks, $\alpha$					$K_\alpha$	$S^2$	$S$
		14	15	...	19	20			
Experimental	19	-	-	...	4	8	0.926	$5.10 \cdot 10^{-3}$	0.0714
Control	54	7	16	...	4	2	0.786	$5.93 \cdot 10^{-3}$	0.0761
$t = 6.44 > t_{1-0.05/2;71} = 1.666$									

# Conclusion

The training of engineering specialists within additional professional educational system, including specialists in the field of metrology, makes it necessary to show consumers of additional professional educational services the ability of an educational organization to guarantee the quality of educational processes. In this regard, the use of tools for confirming the quality of the implemented educational process in an educational organization (resource provision, educational technologies, regulatory and methodological documentation, etc.) is of particular relevance in order to reduce consumer risks.

The proposed procedure for statistical substantiation of the quality of the educational technology used in the educational process allows not only to assess the quality of educational process parameters correctly, but also to increase the reliability level of the data obtained.