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## Instructional technology and material development courses motivation scale

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### Abstract

The aim of this research is to develop to determine university students' motivations against Instructional Technology and Material Development Course. The pre-trial form of Instructional Technology and Material Development scale (İTMDS) containing 46 item was administered to 464 university students an explanatory factor analyzing was conducted so as to determine construct validity. On the data, items that were not significant according to the t value results were deleted from the scale and item total correlation were calculated. For concurrent validity "curiosity index was used and Pearson Correlations coefficient having relation with the lack of curiosity sub-dimension İTMDS was found.78. Consequently, The Croanbach alpha internal consistency coefficient of the ultimate scale containing 33 items and six sub-dimension (competency, internal and external support, realizing the needs, performance improving, aiming the success, realizing the hardships) was calculated as 87. All the analyses conducted made it clear that İTMDS was valid and reliable as scale to determine motivation against Instructional Technology and Material Development course

*Keywords:*Material, instructional technology, motivation, reliability, validity

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### 1. Introduction

In teacher training programs use of tools and material during the course has been considered significant and been positioned under titles such as "Educational tools", "Educational technology" and "Instructional Technologies and Material Development". In Faculty of Education program, this is a 3 credit course; 2 credits theoretical and 2 credits applied. Within the context of this course students acquire the ability to make presentations that can develop materials which meet instructional goals, select and apply the material-appropriate tool, structure the developed material in line with the level of target mass and enable students' interaction by means of developed materials.

In modern age a good portion of instructional materials are developed and structured in computer-assisted digital environments. Computer-assisted instructional materials on the other hand consist of small learning objects (Wagner, 2002). Learning object is any digital source of information that supports learning and be used repeatedly in a wide range of courses (Wiley, 2002). As stated by Polsani (2003) effective use of learning objects in material design is related to the qualities of learning objects which are accessibility, reusability and independency. Learning

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objects that are designed in line with these three cardinal principles can, by virtue of their characteristics, meet the individuals' instantaneous as well as prospective extracurricular learning needs (Longmire, 2000).

Learning objects inside the materials contribute the process in keeping students alert, data processing, recalling the old data, concretization of abstract concepts, making learning interesting, simplifying the presentation, condensing educational-instructional process, ensuring continuity in thinking, activating instructional process, contributing to vocabulary improvement of students (Çilenti, 1988; Şahin and Yıldırım, 1999; Şimşek, 2002; Yıldız, 2002).

Not the context of materials but rather the approaches they reflect gain increasingly more importance. In material development two philosophical approaches basically take stages which are objectivism and constructivism (Gürol, 2002). Both approaches suggest different hypotheses regarding the perceiving and reality of objects. Objectivism which is an external medium of realism and constructivism which is an internal medium of realism are based on counter recognitions.

According to objectivist approach knowledge exists as an objective reality independent of the learner. It is the function of trainers to transmit these knowledge and the learner's function is to receive the presented knowledge hence knowledge is a reality that is obtained from learning materials and described independently of the experience of learner (Jonassen, 1991). Small learning units that can be managed by learners and from which appropriate feedbacks and reinforce can be given enable the presentation of small union sets or sets of knowledge. Small knowledge sets can also enhance the attention and motivation of the learner (Banks, 2001).

Since behavioral approach utilizes technologies according to binging and purging principle the material has gained incredible significance. Material presentations have been effective in all stages of instruction starting from instructional objective to behavior analysis, educational status to context and target based evaluation approach.

Contrary to objectivist approach constructivist approach regarded knowledge as a process that the individual constructs and reflects in his/her mind as an outcome of the interaction with environment. Constructivist learning views knowledge as a construction process that reflects personal experiences of the individual, a process of structuring that is based on the mental structure and beliefs of learner (Jonassen, 1994). Learning is a mental constructivism that is supported by the feedback that learner receives upon interacting with the knowledge objects in materials.

Within that scope the function of technology is to meet knowledge formation needs of individuals (Jonassen, Mayes, and McAleese, 1993). To that end technologies are used not to transmit the constructed knowledge but to support knowledge formation of the individual (Winn, 1991).

Regardless of the approach they reflect instructional materials are expected to ensure obtaining the targeted success from the student and this is closely related to achieving student motivation.

In relevant literature motivation has been explained in different ways. As stated by certain researchers motivation is "a theoretical concept applied in illustrating the commencement, direction, strength and persistence of an object-oriented behavior" (Brophy (1998:3). According to Paris and Turner (1994) motivation is not a multi-dimensional structure. Four qualities of motivation are inherent in individuals. The first one is that motivation is the outcome of cognitive evaluations of individuals. Second one is that motivation is interrelated to conditions because individuals interpret the events, targets and outcomes of a set of situations in their own way. Third quality is that motivation can change as a result of objectives, values, awards and competency in a specific field. Lastly these cognitive interpretations are built and changed by people themselves (Yılmaz ve Çavaş, 2007; transferring from Hynd, Holsch & Nist, 2000).

Motivation is internal or external based. It has been determined that compared to externally motivated students, internally motivated students pay greater heeds during instructional process, relate their acquisitions with their needs and receive satisfaction from their achievements. In their research Keller and Suzuki (1988) noted that in cases when students are aware of what they will obtain at the end of course, they exert more effort to acquire this knowledge.

In order to provide motivation in students conflicting situations with previous knowledge can be created in instructional material, certain stimulus, questions and variances to grab the attention of students can be allocated, the concepts can be concretized to ensure that learning is easier and lasting, certain drawings that take students' attention can be used. Activities directed to motivation can possess qualities that guarantee fun and participation. Different kinds of expression styles can be used in their presentation. In order to assist the students in establishing relationships comfortably, the messages may be related to their own lives and experiences, the student may be supported in acting selectively in perception and establishing a connection. In the instructional materials that are

based on constructivist approach presentation and evaluation questions need to be lined from the easy to harder ones, illustrating the relations, building up trust and providing satisfaction. At the end of exercise and evaluation questions correct answers are praised with statements that give credit to the effort and skill of student. To the end of maintaining students' uninterrupted attention, changes that are related to stimulus strength are applied.

In current study a scale has been developed to detect students' level of motivation towards ITMD course and the reliability and validity of scale has been analyzed. In scale development a 4-stage process has been followed which are: creating an item pool, asking for expert opinion, pre- testing of the draft and detecting construct validity and reliability. Factor analysis technique has been used to determine construct validity and sub-factors.

## 2. Model and Study

In this study, scan model has been used to detect students' level of motivation towards material development course. Randomly selected total 464 students trained in 3rd and 4th classes in Ahi Evran University Faculty of Training have participated in the research. With respect to department and gender, frequency and percentage distribution of the research students has been presented in Table 1.

Table 1. With respect to class and gender the frequency and percentages of students' distribution

Gender	f	%
Male	285	.614
Female	179	.386

Table 2. With respect to class level, distribution of third class students who recently have taken ITMD course and fourth class students who took the course previous year

Level of classroom	f	%
III. classroom	302	.65
IV. classroom	162	.35

302 (65%) students in third class level, 162 (35%) students in fourth class level have responded to ITMDM scale.

## 3. Findings relevant of the Construct Validity of Scale

The pre-trial form of Instructional Technology and Material Development scale (İTMDS) was containing 46 item was administered to 464 university students. Factor analysis has been applied to detect construct validity of the draft consisting of forty- six items. KMO value at the end of analysis has been 0,86. It has been agreed that the size of selected sampling is appropriate for the study. The result of Bartlett test has been calculated to be 10899,918 ( $p < 0,01$ ). The data obtained from analyses indicated that the scale consists of 6 factors which explain 59.226% of total variance. Factor load values of each item in scale are .40 and above .40. Items with lower factor load values and items that are distributed over more than one factor have been eliminated from the scale. Factor analysis results of the remaining 33 items at the end of analyses and reliability coefficients of each factor are given in Table-2.

Table 3. Factor analysis results of ITMD-oriented motivation scale

	Factor load
<b>Competency</b>	
1-When I am told about a fault in a material I developed, I try to locate my mistake. (+)	,784
2-Since material design and development make me rule my own domain I believe material development attempts matter greatly. (+)	,779
3-I believe the materials we develop by ourselves are more appropriate to student level and class equipment.(+)	,744
4-While learning the principles relevant of instructional materials I establish connections with previous materials.(+)	,743

5-Since I know that I am required to employ instructional materials in the profession of teaching I consider material development course significant (+)	,737
6-I set connections between instruction design principles and rules I learnt and other instructional materials.(+)	,723
7-Before preparing instructional material I think about which tools to use in making the presentation (+)	,709
8- I discover the errors in the materials I developed by comparing them with other materials (+)	,688
9- I exert effort to make my own instructional material better than other friends. (+)	,651
10- I consult my teachers or informed friends on how to use the tools that I will utilize during presentation (+)	,609
11-I believe it matters more to develop new materials in place of the available ones (+)	,577
<b>Internal and external support</b>	
12-I feel myself more comfortable when the grounds I prepared the material are approved.(+)	,771
13-I feel myself more successful when my presentation is enjoyed.(+)	,744
14-I feel myself more confident when I can practice material development principles.(+)	,697
15-I feel myself a lot better when my presentation material is enjoyed by other students.(+)	,682
16-I feel myself successful when I give place to different materials and activities in presentation. (+)	,652
17-When the materials my friends prepare are different, attractive and appealing I am more willing to participate in the lesson (+)	,513
<b>Realizing the needs</b>	
18-I attend IMD course since it pushes me towards creativity and thinking (+)	,756
19-I am eager to attend IMD course since the teacher lets students free during this course (+)	,720
20- I am eager to attend IMD course since the teacher is more actively involved with us starting from material design to its presentation. (+)	,636
21- I am eager to attend IMD course since students grab an opportunity to discuss the materials they developed in the presentation.(+)	,624
22-I attend IMD course since the teacher employs a variety of instructional materials.	,538
<b>Performance Improving</b>	
23-When instructional materials integrate us into the presentation my interaction with friends increases (+)	,811
24-My competency in material preparation improves with experience and mastery (+)	,686
25-I consider myself praiseworthy when I prepare inexpensive and practical materials for the presentation (+)	,670
26-I like it when my friends tell me I am good at preparing two-dimensional visuals (+)	,531
<b>Aiming the success</b>	
27-Unless I have to, I do not use computer-assisted presentation in course reinforcement (-)	,681
28-I am quite eager to use computer(+)	,680
29-Computer assisted courses are generally more fun (+)	,640
<b>Realizing the hardships</b>	
30-I feel myself incompetent in preparing computer skill requiring material preparation (-)	,788
31-Rather than computer assisted presentations I learn a lot more from the presentation made with other tools (-)	,550
32-It is not worth making efforts on computer for computer-assisted instruction (-)	,449
33-I prefer to study with my friends rather than prepare instruction oriented materials independently (-)	,409

In the first factor (Competency) which is one of the sub factors of ITMD Motivation scale there are 11 items and factor load distributions of these items vary between 0.57 and 0.78. In the second factor (Internal and external support) of scale there are 6 items and factor load distributions of these items vary between .51 and .74. In the third factor “Realizing the needs” there are 5 items stated and factor load distributions of these items vary between .51 and .75. In the fourth factor “Performance improving” there are 3 items stated and factor load distributions of these items vary between .52 and .81. In the fifth factor “Aiming the success” there are 5 items and factor load distributions of these items vary between .64 and .68. In the last factor of scale “Realizing the hardships” there are 4 items present and factor load distributions of these items vary between 0.41 and .

### 3.1. Findings Relevant of Item Analysis

Correlation coefficients calculated for scale items are given in Table 4. As demonstrated in the table correlation coefficients change from 0,10 to 0,67 and correlation values are meaningful in 0,05 level

Table 4. The average, standard deviation and correlation coefficients of ITMD Motivation Scale

Item number	Mean	Standart Deviation	Corelation	Item number	Mean	Standart Deviation	Corelation
1	2,28	1,09	.43**	18	3,65	1,15	.76**
2	2,43	1,16	.22**	19	3,65	1,06	.77**
3	2,31	1,13	.20**	20	3,67	1,13	.71**

4	3,01	1,05	.17**	21	3,85	1,16	.61**
5	3,56	1,05	.60**	22	3,94	1,07	.27**
6	3,85	1,01	.69**	23	3,69	1,11	.45**
7	3,62	1,09	.67**	24	3,88	1,00	.43**
8	3,54	1,00	.62**	25	3,77	1,10	.39**
9	3,80	1,13	.66**	26	3,74	1,12	.17**
10	3,52	1,07	.58**	27	3,41	1,09	.16**
11	3,90	1,25	.69**	28	3,22	1,13	.23**
12	3,75	1,19	.72**	29	3,65	1,15	.50**
13	2,28	1,09	.66**	30	3,65	1,06	.48**
14	2,43	1,16	.53**	31	3,67	1,13	.51**
15	2,31	1,13	.65**	32	3,22	,97	.64**
16	3,01	1,05	.60**	33	3,43	,99	.51**
17	3,56	1,05	.81**				

(\*Correlation coefficients are meaningful in 0,01 level)

\*\*Correlation coefficients are meaningful in 0,05 level)

Table 5. Correlation coefficients of scale factors

	F6	F5	F4	F3	F2	F1
Factory6						
Factory5	,368(**)					
Factory4	,614(**)	,222(**)				
Factory3	,588(**)	,111(*)	,232(**)			
Factory2	,764(**)	-,225(**)	,289(**)	,445(**)		
Factory1	,731(**)	-,320(**)	,169(**)	,288(**)	,243(**)	

(\*Correlation coefficients are meaningful in 0,01 level)

\*\*Correlation coefficients are meaningful in 0,05 level)

(F1: “Competency F2: “Internal and external support, F3: “Realizing the needs, F4: “Performance improving F5: Aiming the success F6: Realizing the hardships; \* \* Correlation coefficients are meaningful in 0,01 level))

### 3.1.1. Findings relevant of the Reliability of ITMD Scale

The scale’s reliability Cronbach Alpha Coefficient has been determined as .87 (X= 125,6; sd=16,6). As it can be seen in Table-2 as well, for each factor of scale Cronbach Alpha Coefficient has been calculated and this coefficient changes between.38 and .76. In this study independent t-test has been conducted to find out whether students’ ITMDM scale scores changed meaningfully with respect to their gender. The results of analysis of the whole scale and all factors are demonstrated in Table 7.

Table 6. With respect to gender, students’ levels of motivation towards ITMD course

Gender	N	M	SD	df	t	P
Male	285	109,48	17,32	462	,96	,333
Female	179	107,79	19,85			

According to data obtained from scale with respect to gender there has not been a meaningful differentiation in motivation levels df=462; t=.96 P>0.05 of students towards ITMD course.

Table 7. Motivation levels of the students who have recently taken ITMD course and the students who took the course previously

Level of classroom	N	M	SD	df	t	P
III. classroom	302	112,30	17,49	462	3,68	,000

IV.classroom	162	105,88	18,64
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It is demonstrated that between third class students who have recently taken ITMD course and fourth class students who took the course previous year there has been a meaningful difference  $df=462$ ;  $t=3.68$   $P<0,05$  level in favor of third class students. The difference between the highest 27% part and the lowest 27% part has been analyzed via t test and all items have been found to be meaningful in  $p<0,05$  level in terms of discrimination effect.

#### 4.Conclusion and Suggestions

In present study validity and reliability analysis of “Instructional Technologies and Material Development Course Oriented Motivation Scale” has been conducted. Validity of scale has been determined by taking expert views, conducting factor analysis, item total correlations and detecting discrimination level of each item. At the end of analysis the scale has been constructed of 6 dimensions and the variance 6 factor structure explained jointly is 59,226%. At the end of factor analysis, the items of which factor loads are below .40 have been eliminated from the scale. Among the factors consisting the scale reliability coefficients have been calculated as .73 for the first factor, .76 for the second factor, .58 for the third factor, .62 for the fourth factor, .61 for the fifth factor and .64 for the sixth factor. Item total correlations calculated for the scale vary between 0.16 and 0.81. Scale’s reliability Cronbach Alpha Internal Consistency Cronbach Alpha coefficient has been found as .87, Gutman Alpha coefficient as .89. Based on the fact that the reliability level set forth for measurement tools that can be used in researches is .70 (Tezbaşaran, 1996) it can reasonably be argued that the reliabilities of scale calculated via both methods are sufficient.

In the study it is demonstrated that third class students who have recently taken the course are more motivated than the fourth class students who took the course previous year. With respect to gender there has not been a differentiation between female and male students in terms of their motivational level towards ITMD course. It is feasible to suggest that ITMD Motivation Scale possesses qualities that can be applied in detecting motivation levels of students in teacher training programs.

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