A Study of the Relationship between Students' Learning Styles and Instructional Inputs in a Teacher Education Programme of IGNOU

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Introduction

In the Open University system of India, teacher education programmes for in-service teachers from the primary to university stages are offered through an open distance learning mode. These programmes are growing in importance as they meet the professional needs and technological requirements for a teaching-learning system.

Unlike conventional institutions, which are selective and thus create class barriers, open institutions take education to the doorsteps of in-service teachers who can study at any time in their lives. In the conventional system, teacher education involves formal institution-based programmes which give little emphasis to real school-based practice, while in an open system in-service teachers' work can be combined with professional development activities. In this respect, open and distance learning (ODL) contributes significantly to the emergence of a work-oriented learning system and is more effectively than the conventional system of teacher education.

The curricular inputs in ODL teacher education programmes incorporate various kinds of learning elements, such as the study of distance learning materials; the use of training manuals for organizing various kinds of school-based practical sessions; group activities during workshops held at Study Centres; the use of ICT-based media packages and interactive learning processes; and continuous assessment and feedback. These inputs are adapted to suit different curricular objectives, as well as the learning practices of the target groups of learners.

Learning style refers to the characteristic strengths and preferences of learners for responding to stimuli in the environment and processing information — it is a behavioural pattern developed for any new learning. This approach to learning emphasizes that individuals perceive and process information in very different ways. The learning style theory implies that how much individuals learn has more to do with whether the education experience is geared to their particular styles of learning than whether or not they are 'smart'.

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A comprehensive definition of learning styles that has been adopted by leading theorists in the field is given by Keefe (1979), as follows:

> … the composite of characteristic cognitive, affective and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment.

In open distance learning systems, the learners adopt different kinds of learning style in the context of different background factors as well as instructional inputs. It is worthwhile to explore the kinds of learning style of ODL students in teacher education with special reference to the instructional inputs in teacher education programmes.

Grasha-Reichmanns' student learning styles

Anthony Grasha and Sheryl Reichmann (1996) focus more on students' preferences for the learning environment. They identified six different learning styles viz. independent, avoidant, collaborative, dependent, competitive and participant:

1. **Independent style**: Independent students prefer independent study, self-paced instruction, and working alone on course projects rather than with other students. They like to think for themselves and are confident in their learning abilities; and they prefer to learn content that they feel is important. They are confident learners that don't have the need to confer with others.
2. **Dependent style**: Dependent learners look to teacher and peers as a source of structure and guidance, and prefer authority figures to tell them what to do. They show little intellectual curiosity and learn only what is required.
3. **Competitive style**: Competitive student learn in order to perform better than their peers. They see the classroom as a win-lose situation in which they must win. They like to be the centre of attention and to receive recognition for their accomplishments in class.
4. **Collaborative style**: Collaborative learners learn through sharing and cooperating with their teacher and peers in small group discussion and group projects.

5. **Avoidant style**: Avoidant learners are not enthusiastic about learning content and attending classes. They are reluctant to learn and uninterested in participating in class activities with their teachers and peers. They do not enjoy learning and generally try to avoid it at all costs. They are uninterested and overwhelmed by what goes on in class. They may not even want to attend class.
6. **Participant style**: Participant learners are eager to learn and enjoy classroom activities and discussion. They take responsibility for their learning, and are eager to do as much class work as possible. They are highly motivated to meet the teacher's expectations, enjoy going to class and take part in as many of the course activities as possible, both required and optional.

Instructional Inputs

The field of education, especially distance education, is becoming heavily dependent on sound instructional strategies for delivering teaching. The first generation of distance education depended solely on the print medium, but today's fifth generation now involves an intelligent flexible learning model. The number of institutions adopting information and communication technology (ICT) has been growing (Reddy & Srivastava, 2003), and ICT is diminishing the 'distance' in distance education. Using information technologies, students can decide on their studies, learning time and place, and resources in a better way (Hussain & Safdar, 2008). Rather than using only one kind of technology, distance education institutions may now use various technologies for delivering instructions. Such an approach involving the use of multiple media has been hailed by Peters (2005) as a big step forward. IGNOU too uses multiple media (including print and other mass media) and modes for delivering its instruction for its various programmes, including its Bachelor of Education (BEd) programme. As Figure 1 shows, the main instructional inputs used in the BEd course by distance learners are:

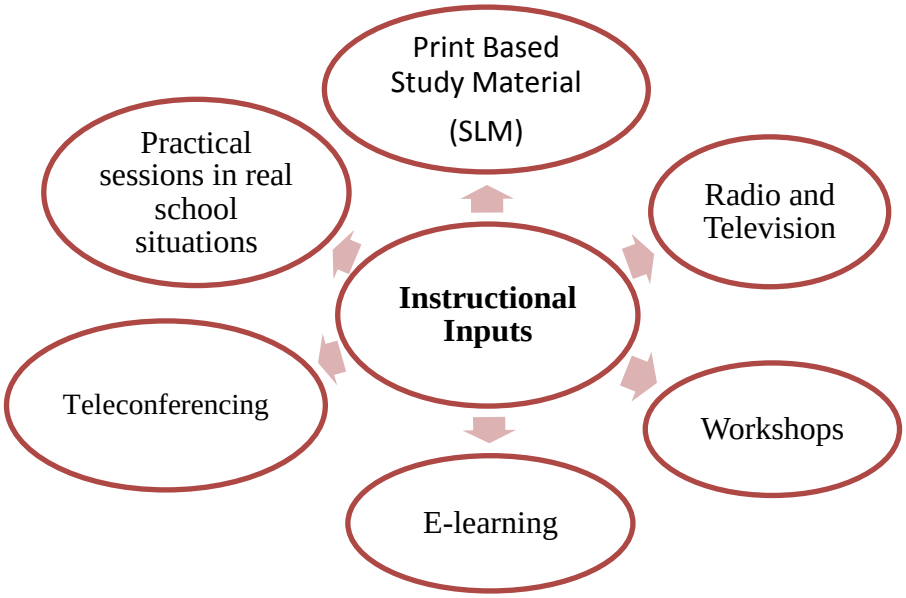

Figure 1 Instructional inputs used in BEd programme

- Print-based study materials
- Practical sessions in real school situations
- Workshops
- E-learning
- Radio and television
- Teleconferencing.

Review of Related Literature

Gunawardena, Jayatilleke and Lekamge (1996), who studied the learning styles of open university students in Sri Lanka, found that the dominant style in their entire population (BSc and PGDE students) was that of the assimilator, which was followed by both the converger and diverger learning styles. The least frequent style was that of the accommodator. The pattern was similar for both males and females. Also, Diaz and Cartnal (1999) carried out a comparative study of student learning styles in an online distance learning and an on-campus class. Correlational analysis revealed that the on-campus students displayed collaborative tendencies that were positively related to their need to be competitive and to be a 'good class member'. Thus, the on-campus students appeared to favour

collaborative styles to the extent that they helped them to obtain class rewards. In contrast, online students were willing and able to embrace collaborative teaching-learning styles if the instructor made it clear that this was expected, and gave them guidance on meeting this expectation. Online students appeared to be driven more by intrinsic motivation and clearly not by the reward structure of the class. Online students were more independent and on-campus students more dependent in their learning styles. Also, Manochehr's (2006) comparison of the learning styles of students involved in online learning and traditional instructor-based learning showed that, while the learning style in traditional learning was irrelevant, in online learning it was very important. Students with assimilator and converger learning styles performed better with online learning, while those with accommodator and diverger learning styles received better results in traditional instructor-based learning. Finally, in the 2006 study by Mupinga, Nora and Yaw on 'the learning styles, expectations and needs of online students' reported that the learning styles with the highest number of students were the introvert, sensor, thinker and judger type (16%); introvert, sensor, feeler and judger type (16%); introvert, sensor, thinker and perceiver type (14%); and extrovert, sensor, feeler and judger (8.4%). The learning styles with the lowest number of students were the extrovert, intuitor, thinker and judger type (0.76%); the introvert, intuitor, feeler and perceiver type (1.53%); the extrovert, intuitor, feeler, and judger type (1.53%); and the extrovert, sensor, thinker and perceiver type (2.29%). No particular learning style was found to be predominant among the online students; and, hence, it was concluded that the design of online learning activities should strive to accommodate students with multiple learning styles.

From the above studies, it can be seen that most of the learning styles are of a co-relational type. Learning styles have been compared with instructional methods, teaching styles, and the achievement of students in general and, in particular, with the content area. Gender has been considered as a significant variable in some studies. All the research projects are related to learning, the classroom, pupil characteristics and the teacher's instructional mode.

To date, no study has been conducted on the learning styles of BEd students in open universities in the Indian subcontinent. The present study is an attempt to explore the learning styles of students on in-service distance education teacher education programmes in different institutions. The present research can make a significant contribution to our existing knowledge of learners, study behaviours and learning styles in the context of studying predominantly through learning materials and media.

The Need For and Significance of This Study

Indira Gandhi National Open University (IGNOU) was established on 20 September 1985 by an Act of Parliament. Its School of Education offers a Bachelor of Education programme (BEd) to develop the competencies and understanding needed by practising teachers for effective teaching and learning at the secondary school level. The programme offers opportunities for in-service teachers to choose, organize and share their experiences; and it includes print-based material, practicals in real school situations, workshops and e-learning.

The BEd programme offered by IGNOU is an innovative programme which utilizes self-instructional material and information technology, along with interactive personal contact programmes in which practising teachers can share their experience. It aims to develop the understanding and competencies required by teachers for an effective teaching-learning process at the secondary school stage. It is a judicious mix of theoretical and practical courses, with relevant illustrations and cases, and needs-based activities, comprising the core of each course. The instructional inputs are linked to the learning styles of distance learners. Every BEd trainee learns according to his/her learning style using different instructional inputs. A study on learning styles and instructional inputs will help us to understand the learning styles of BEd trainees and the roles of different inputs in their learning. It may also be used for dealing with issues of curriculum transaction and evaluation of various kinds of learning practices.

The Objectives of the Present Study

The objectives of this research on BEd students in IGNOU were to examine the relationships between students' different learning styles and their level of emphasis on:

1. the study of print-based materials;
2. the practicals in real school situations;
3. workshop practices; and
4. e-learning activities.

Hypotheses

1. Different learning styles and students' emphasis on the use of print-based study material are independent of each other.

2. Different learning styles and students' emphasis on practicals in real school situations are independent of each other.
3. Different learning styles and students' emphasis on workshop-practices in Study Centre are independent of each other.
4. Different learning styles and students' emphasis on e-learning practices are independent of each other.

Research Design

Tools used

A descriptive survey method was used in this study. Grasha-Reichmann Learning Style Scale (GRLSS) (1996) was adopted to determine the learning style of learners; and a rating scale was used to collect data from the students about their emphasis on the different instructional inputs of the open distance learning mode viz. print-based study material, practicals, workshop activities and e-learning.

Population and sample

The population consisted of all the second-year BEd trainees enrolled in the programme at the Study Centres in Uttar Pradesh. The sample consisted of 150 final-year BEd students. Two IGNOU Study Centres — Ewing Christian College, Allahabad, and RBD College, Bijnor — were selected for data collection purposes. Seventy five trainees from each Study Centre were chosen as sample subjects according to their availability.

Data Collection

Data were collected from the sample respondents available in the programme Study Centres during extended contact programmes by administrating the questionnaire.

Analysis and Interpretation of the Data

The learning styles of trainees and the level of emphasis on the various instructional inputs were determined in category form. A chi-square test of independence was used to test the null-hypotheses of the study. The analysed data are presented in the Table 1.

Table 1 χ^2-test of independence between learning styles and emphasis on the use of print-based study materials

SN	Variable		Emphasis on the use of print-based material		Total	χ^2-value
			High emphasis	Moderate emphasis		
1	Independent learning style	High	78 (87.64)	51 (83.61)	129	0.49 NS
		Moderate	11 (12.36)	10 (16.39)	21	
	Total		89 (100)	61 (100)	150	
2	Avoidant learning style	Moderate	79 (88.76)	51 (83.61)	130	0.83 NS
		Low	10 (11.24)	10 (16.39)	20	
	Total		89 (100)	61 (100)	150	
3	Collaborative learning style	High	84 (94.38)	56 (91.80)	140	0.39 NS
		Moderate	05 (5.62)	05 (8.20)	10	
	Total		89 (100)	61 (100)	150	
4	Dependent learning style	High	52 (58.43)	24 (39.34)	76	5.27 *
		Moderate	37 (41.57)	37 (60.66)	74	
	Total		89 (100)	61 (100)	150	
5	Competitive learning style	High	84 (92.31)	51 (86.44)	135	1.37 NS
		Moderate	07 (7.69)	08 (13.56)	15	
	Total		91 (100)	59 (100)	150	
6	Participant learning style	High	57 (64.04)	30 (49.18)	87	10.94 **
		Moderate	32 (35.96)	31 (50.82)	63	
	Total		89 (100)	61 (100)	150	

Note: Figures in parenthesis indicate percentages; NS = not significant.
* Significant at the .05 level, ** significant at the .01 level

Table 1 shows that the calculated χ^2-value of independence between the *independent, avoidant, collaborative and competitive learning styles* and the level of emphasis on *print-based material* were 0.49, 0.83, 0.39 and 1.37 respectively. The obtained χ^2-values are less than the Table value (3.841) at the .05 level of significance with df: 1. As the observed values are not found to be significant, the emphasis on print-based material and learning styles are *not* associated with each other in the context of independent, avoidant, collaborative and competitive learning styles.

It can also be seen from Table 1 that the calculated chi-square value of independence between *dependent* and *participant* learning styles and the

emphasis on *print-based material* are 5.27 and 10.94 respectively. The obtained χ^2-values are greater than the Table value (3.841) at the .05 level and (6.635) at the .01 level of significance respectively with df: 1. Thus, the observed values indicate a *significant association between an emphasis on print-based material and dependent and participant learning styles among the BEd trainees.*

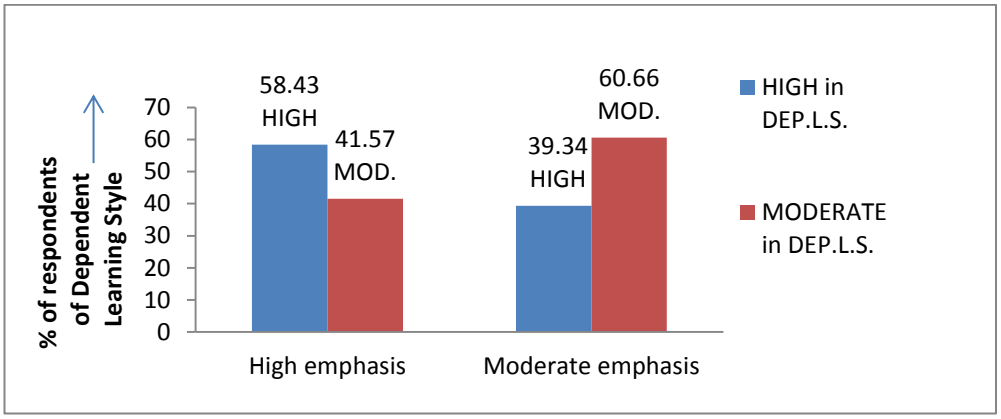

Figure 2.1 Emphasis on print-based materials

Figure 2.1 indicates that, of high users of print-based self-study materials, a large majority (58.43%) were in the highly dependent category of learning style. However, among moderate level users of the print-based materials, a large majority (60.66%) were in the moderate dependent category of learning style. This shows that in the large majority of cases, more emphasis on the use of print-based study materials led to a more dependent learning style in learners.

ODL learners depend on other sources of learning to complete their coursework. The students' dependency on counsellors, experts, peers, mentors and other sources to help them to have greater clarity in their study of self-study materials. Hence, it is common for high-level users of study materials to be more dependent on other sources than their moderate level user counterparts.

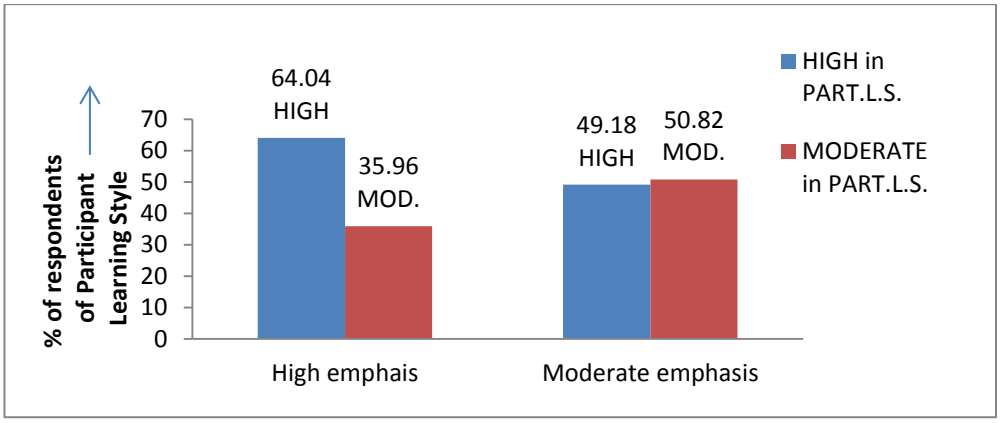

Figure 2.2 Emphasis on print-based materials

Figure 2.2 shows that a large majority of high users (64.04%) of print-based study materials had a high participant learning style; while the majority of moderate users (50.82%) of print-based study materials were of a moderate level participant learning style. This indicates that, for the majority of learners, an emphasis on print-based self-study materials was significantly associated with a participant learning style. The use of study materials prompted students to participate in various kinds of instructional activities. The handbooks, guides and course materials, for example, acted as major sources of participatory learning activities among ODL learners.

Table 2 χ^2-test of independence between learning styles and the emphasis on practicals in real school situations

SN	Variable		Emphasis on practicals in real school situations		Total	χ^2-value
			High emphasis	Moderate emphasis		
1	Independent learning style	High	63 (90)	66 (82.5)	129	1.74 NS
		Moderate	07 (10)	14 (17.5)	21	
	Total		70 (100)	80 (100)	150	
2	Avoidant learning style	Moderate	59 (83.1)	71 (89.87)	130	1.49 NS
		Low	12 (16.90)	08 (10.13)	20	
	Total		71 (100)	79 (100)	150	
3	Collaborative learning style	High	66 (94.29)	74 (92.5)	140	0.19 NS
		Moderate	04 (5.71)	06 (7.5)	10	
	Total		70 (100)	80 (100)	150	

4	**Dependent learning style**	**High**	42 (60)	34 (42.5)	76	**4.58 ***
		Moderate	28 (40)	46 (57.5)	74	
	Total		70 (100)	80 (100)	150	
5	**Competitive learning style**	**High**	64 (91.43)	71 (88.75)	135	**0.30 NS**
		Moderate	06 (8.57)	09 (11.25)	15	
	Total		70 (100)	80 (100)	150	
6	**Participant learning style**	**High**	48 (68.57)	39 (48.75)	87	**6.02 ***
		Moderate	22 (31.43)	41 (51.25)	63	
	Total		70 (100)	80 (100)	150	

Note: Figures in brackets indicate percentages; NS = Not significant.
***** Significant at .05 level

Table 2 shows that the calculated χ^2-value of independence between *independent, avoidant, collaborative* and *competitive* learning styles and the level of emphasis on *practicals in real school situations* is 1.74, 1.49, 0.19, and 0.3 respectively. The obtained χ^2-values are less than the Table value (3.841) at the .05 level of significance with df: 1. The observed values were *not* found to be significant. Therefore, the level of emphasis on practicals in real school situations and the learning styles are *not* associated with each other in the context of independent, avoidant, collaborative and competitive learning styles.

It can also be seen in Table 2 that the calculated chi-square values of independence between dependent and participant learning styles and the emphasis on practicals in real school situations were 4.57 and 6.02 respectively. The obtained χ^2-values are greater than the Table value (3.841) at the .05 level of significance with df: 1. The observed values are found to be significant. Therefore, trainee's emphasis on *practicals in real school situations* and *their learning styles are found to be associated with each other significantly.*

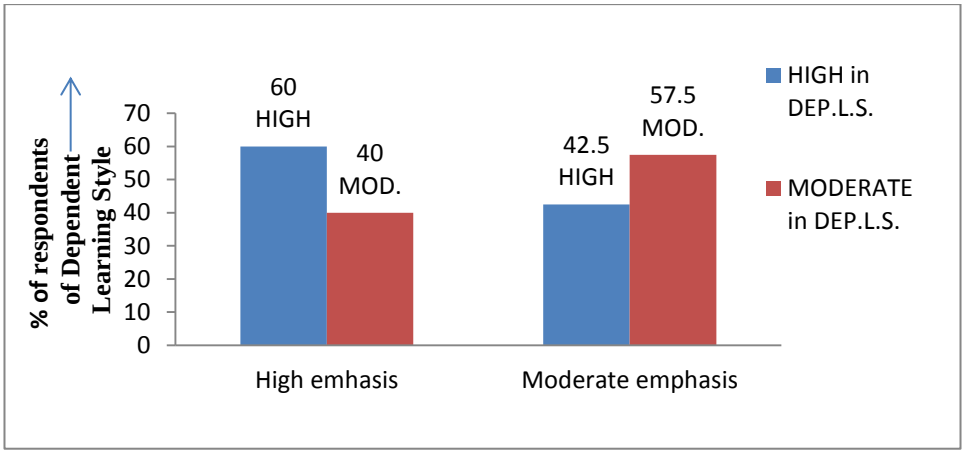

Figure 3.1 Emphasis on practicals in real school situations

The findings in Figure 3.1 reveal that students' level of involvement in the organization of practical activities in real school situation made them more dependent and participatory in learning activities. This figure also indicates that a large majority of learners with a high emphasis on practical activities (60%) are in a more dependent learning style category. However, the majority of learners with a moderate level of emphasis on practical activities (57.5%) were of a moderate level of the dependent learning category. The ODL students being more involved in practical activities in real school situations depends heavily on other support systems which make them high dependent learners.

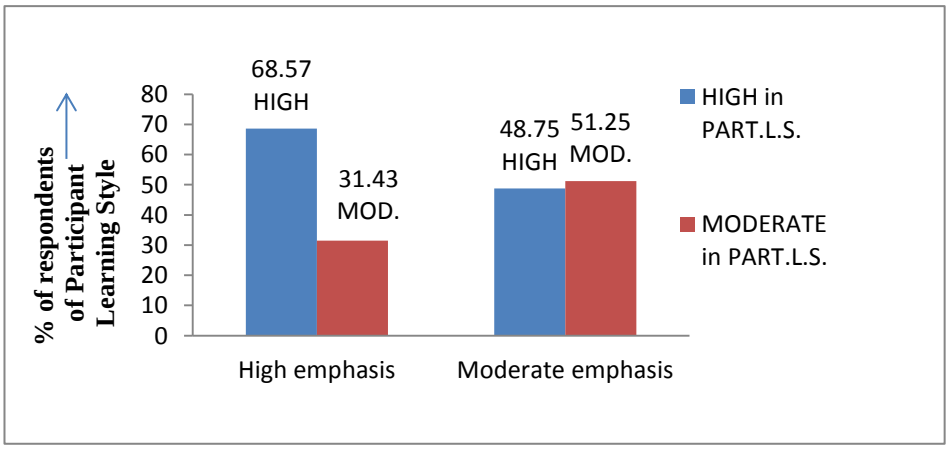

Figure 3.2 Emphasis on practical in real school situations

Figure 3.2 indicates that a large majority of students (68.57%) who placed a high emphasis on real school-based practicals were in the high participant category of learning style. On the contrary, the majority of students (51.25%)

who put a moderate emphasis on practical activities were in the moderate category of participant learning style. School-based practicals take place in a participatory form, where learners who are highly involved in such activities take part in various kinds of planning, organizational, operational and assessment activities more than their moderate level counterparts.

Table 3 χ^2-test of independence between learning styles and the emphasis on workshop practices in Study Centres

SN	Variable		Emphasis on Workshop practices		Total	χ^2-value
			High emphasis	Moderate emphasis		
1	Independent learning style	High	79 (86.81)	50 (84.75)	129	0.13 N.S.
		Moderate	12 (13.19)	09 (15.25)	21	
	Total		91 (100)	59 (100)	150	
2	Avoidant learning style	Moderate	76 (83.52)	54 (91.52)	118	1.99 N.S.
		Low	15 (16.48)	05 (8.48)	20	
	Total		91 (100)	59 (100)	150	
3	Collaborative learning style	High	86 (94.51)	54 (91.53)	140	0.51 N.S
		Moderate	05 (5.49)	05 (8.47)	10	
	Total		91 (100)	59 (100)	150	
4	Dependent learning style	High	52 (57.14)	24 (40.68)	76	3.88 *
		Moderate	39 (42.86)	35 (59.32)	74	
	Total		91 (100)	59 (100)	150	
5	Competitive learning style	High	84 (92.31)	51 (86.44)	135	1.37 N.S.
		Moderate	07 (7.69)	08 (13.56)	15	
	Total		91 (100)	59 (100)	150	
6	Participant learning style	High	66 (72.53)	21 (35.59)	87	20.04 **
		Moderate	25 (27.47)	38 (64.41)	63	
	Total		91 (100)	59 (100)	150	

Note: Figures in parenthesis indicate percentages; N.S = Not significant.
*****Significant at .05 level; ******Significant at .01 level

As Table 3 shows, the calculated χ^2-values of independence between *independent, avoidant, collaborative* and *competitive* learning styles and the level of emphasis on *workshops* were found to be 0.13, 1.99, 0.51 and 1.37 respectively. The obtained χ^2-values are less than the Table value (4.731) at the .05 level of significance with df: 2 (for avoidant) and (3.841) at the .05 level of significance with df: 1. The observed values are *not significant*.

Hence, the level of emphasis on workshops and the learning styles are *not associated with each other* in the context of avoidant, independent, collaborative and competitive learning styles.

It can also be seen from this table that the calculated chi-square value of independence between dependent and participant learning styles and the emphasis on workshops were 3.88 and 20.04 respectively. The obtained χ^2-values are greater than the Table value (3.841) at the .05 and (6.635) at .01 levels of significance with df: 1 respectively. Therefore, there is a *significant association between students' emphasis on workshops and dependent and participant learning styles.*

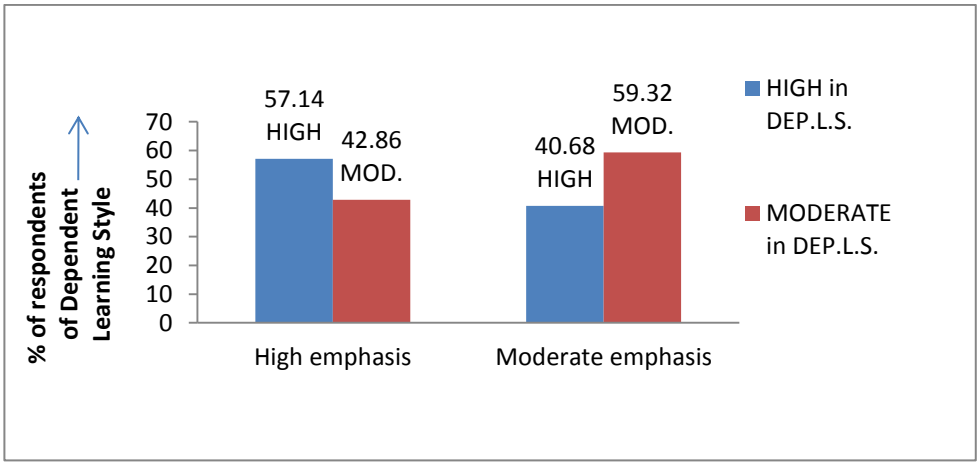

Figure 4.1 Emphasis on workshops practices

Figure 4.1 indicates that the majority of trainees placing a high emphasis on workshop practices (57.14%) had a dependent learning style. However, the majority of trainees with a moderate emphasis on workshop practices (59.32%) were of a moderate level dependent learning style. This reveals that distance learners participating in workshop practices were more dependent on various sources of learning than those with less involvement during workshop practices.

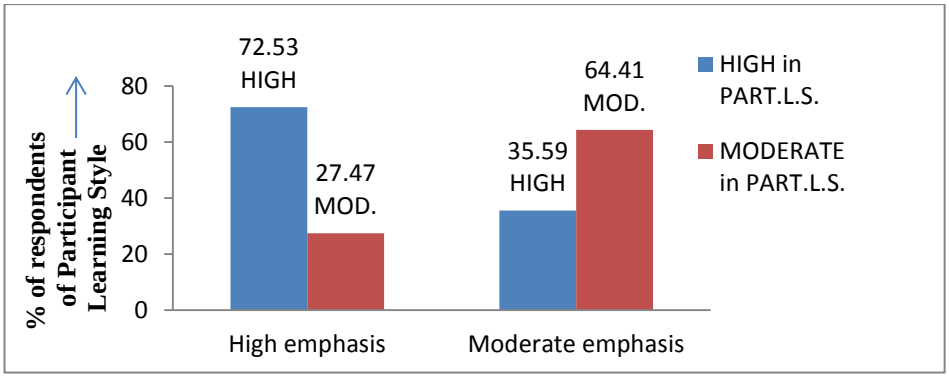

Figure 4.2 Emphasis on workshops practices

It can be seen in Figure 4.2 that a large majority of ODL mode trainees giving a high emphasis to workshop practices (72.53%) had a participant learning style; but the majority of trainees (64.41%) who were moderate level workshop practitioners were in the moderate participant learning style category. The above description indicates that a high-level participatory learning style among learners places a high emphasis on workshop practices.

Table 4 χ^2-test of independence between learning styles and emphasis on e-learning practices

SN	Variable		Emphasis on e-learning practices		Total	χ^2-value
			Moderate emphasis	Low emphasis		
1	Independent learning style	High	102 (91.07)	27 (71.05)	129	9.44 **
		Moderate	10 (8.93)	11 (28.95)	21	
	Total		112 (100)	38 (100)	150	
2	Avoidant learning style	Moderate	99 (88.39)	31 (81.58)	118	1.14 NS
		Low	13 (11.61)	07 (18.42)	20	
	Total		112 (100)	38 (100)	150	
3	Collaborative-learning style	High	106 (94.64)	34 (89.47)	140	1.22 NS
		Moderate	06 (5.36)	04 (10.53)	10	
	Total		112 (100)	38 (100)	150	
4	Dependent learning style	High	59 (52.68)	17 (44.74)	76	0.72 NS
		Moderate	53 (47.32)	21 (55.26)	74	
	Total		112 (100)	38 (100)	150	

5	**Competitive learning style**	**High**	102 (91.07)	33 (86.84)	135	**1.48 NS**
		Moderate	10 (8.93)	05 (13.16)	15	
	Total		112 (100)	38 (100)	150	
6	**Participant learning style**	**High**	67 (59.82)	20 (52.63)	87	**0.60 NS**
		Moderate	45 (40.18)	18 (47.37)	63	
	Total		112 (100)	38 (100)	150	

Note: Figures in parenthesis indicate percentages; NS = Not significant.
******Significant at .01 level

As can be seen in Table 4, the calculated χ^2-values of independence between *avoidant*, *collaborative*, *dependent*, *competitive* and *participant learning styles* and the response pattern of trainees on user levels of *print based material*s are 1.14, 1.22, 0.72, 1.48 and 0.60 respectively. The obtained χ^2-values are less than the Table value (3.841) at the .05 level of significance with df: 1. Thus, the observed values are *not significant*. So the level of emphasis on e-learning and the learning styles are *independent from each other* in the context of avoidant, collaborative, dependent, competitive and participant learning styles.

Table 4 also indicates that the calculated value of independence between independent learning style and the emphasis on e-learning is 9.44. The obtained χ^2-value is greater than the Table value (6.635) at the .01 level of significance with df: 1. Thus the observed value has been found to be significant, and hence the trainees' *emphasis on e-learning* and *an independent learning style are associated with each other significantly.*

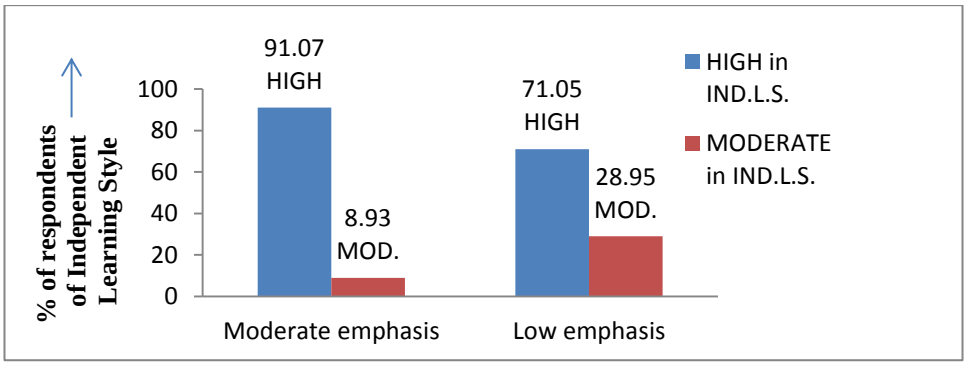

Figure 5 Emphasis on e-learning practices

Perusal of Figure 5 reveals that there was a very high significant relationship between the emphasis on e-learning and an independent learning style. A large majority of students (91.07%) emphasizing e-learning practices were in the independent learning style category, while

the figure for their low emphasis counterparts was 71.05%. In other words, e-learning practices tended towards an independent learning style significantly.

Conclusion

ODL learners depend on other sources of learning to complete their coursework. The students' dependency on counsellors, experts, peers, mentors and other sources helped them to have greater clarity in their study of self-study materials. Therefore, it is common for high level users of study materials to be more dependent on other sources than their moderate level user counterparts. The majority of learners giving emphasis to print-based self-study materials were significantly associated with a participant learning style. The use of study materials prompted students to participate in various kinds of instructional activities — for instance, the handbooks, guides and course materials acted as a major source of participatory learning activities among these ODL learners. The ODL students who were more involved in practical activities in real school situations depended heavily on other support systems which made them high dependent learners. Conducting school-based practicals takes place in a participatory form, where highly involved learners take part in various kinds of planning, organizational, operational and assessment activities more than their moderate level counterparts. Distance learners' participation in workshop practices were more dependent on various sources of learning than those less involved in such practices. A high level participatory learning style gave a high emphasis to workshop practices. Finally, e-learning practices tended towards an independent learning style significantly.

Implications

Better opportunities need to be provided to encourage independent self-studies as well as collaborative learning practices. The e-learning support services, along with interactive learning sessions, must be promoted in teacher education programme.

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