Exploration and Analysis of Factors Influencing Group Learning

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ABSTRACT

The purpose of this paper is to explore which factors influence group learning content, and content analysis is chosen as the research method. The sample for this study is the literature on group learning. 35 books and 1 paper are examined. The coding system for the content analysis is an opened and a self-expanded system in this study, which means that the original coding system can be updated if the new coding item is developed during the data collection. A total of 62 influencing factors are identified in terms of the content analysis. In order to organise them systematically, we categorised them into four aggregations according to one model of the group learning processes: planning, organising, learning process, and evaluation. The result of this study may be used to design a questionnaire and to model group learning process in our further research.

Keywords
Group learning, content analysis, collaborative learning, classroom-based setting, and CMC-based setting

INTRODUCTION

Much research has already been carried out into group learning, such as group problem solving (Honassen, & Kwan, 2001; Durisburg, & Hoope, 1999), computer-supported group learning (Brabdon, & Hollingshead, 1999; Klein, & Doran, 1999), cooperative learning group (Ross, & Coursins, 1994; Brush, 1997; Collins, 1998), and virtual group learning (Stenmark, 2002). When one reviews the work of the field, one can easily find that there has only been a few studies which address the factors that influence group learning (Jaques, 1984; Reynolds, 1994). To know which factors will influence group learning is important for the field of e-learning research, especially for this study, which will focus on how to use computer to facilitate group learning.

In this study, we try to explore which factors influence group learning processes. In order to identify these factors, we compare some related field works (Lally & Latt, 2003; Barnes & Todd, 1984; Henri, 1992) and choose content analysis as our research method. "Content analysis is a research technique for making replicable and valid inferences from data to their context" (Krippendorff, 1980). Conventionally, content analysis can be considered as a qualitative method. But Berg (1998) argues that "content analysis can be considered as a blend of qualitative and quantitative method". We prefer this perspective. In this study, we will use a qualitative method to identify the factors first, and then use quantitative methods to decide which factors are more essentially related to group learning processes. By this we suggest that these factors will influence group learning process more.

SAMPLING

Group research in literature is already related to its various aspects, such as social, psychological, political, educational characteristics. The samples in this study are chosen from typical books and journal papers in the group learning research field. The issues include group performance, group interaction, group conflict, group leadership, group communication, group dynamic, group structure, group role, group process, and group work, which represent the essential of group. The influencing factors of group learning can be extracted from these issues by content analysis.

The name of each sample can be defined according to their original book title. For this purpose, we define a set of names for the samples which are described in the table 1.

Table 1 the name of the samples

No	The Name of Samples	The Title of the Literature	The type of Samples
1	CL	Communication and Learning in Small Group	B
2	LG	Learning in Groups	B
3	WG	Working in Groups: Communication Principles and Strategies	B
4	SG	Small Group Learning in the Classroom	B
5	GP	Group Process: Papers from Advances in Experimental Social Psychology	B
6	GT	Group Theory for Social Works: An Introduction	B
7	GA	Groups at Work	B
8	GR	Groupwork	B
9	GK	Groupwork Practice	B
10	DG	Dynamics of Group Action	B
11	MG	Motives and Goals in Groups	B
12	LE	Learning from Others in Groups: Experimental Learning Approaches	B
13	GD	Group Dynamics & Individual Development	B
14	IC	Interaction in Cooperative Groups: The Theoretical Anatomy of Group Learning	B
15	GTC	Group Tutoring, Concepts and Case Studies	B
16	JT	Join Together: Group Theory & Group Skills	B
17	IB	Intergroup Cognition & Intergroup Behaviour	B
18	DM	Group Decision Making	B
19	AGP	Socio-Psychological Aspect of Group Process	J
20	GC	Group Dynamics	B
21	LP	Group Work: Learning and Practice	B
22	LTS	Learning Through Small Group Discussion: A Study of Seminar Work in Higher Education	B
23	DWB	Group Process: Dynamics Within and Between Groups	B
24	SGW	Successful Group Work	B
25	CMC	Cooperation in the Multi-Ethnic Classroom	B
26	GPE	Group Performance	B
27	CST	Communication in the Small Group: Theory and Practice	B
28	GPC	Group Process in the Classroom	B
29	GET	Groupwork in Education and Training: Ideas in Practice	B
30	GDR	Group Dynamics: Research and Theory	B
31	ISG	Interaction in Small Groups	B
32	HSG	Handbook of Small Group Research	B
33	LTG	Learning Through Group Experience	B
34	TGT	T-Group Theory and Laboratory Method: Innovation in Re-education	B
35	MTM	Modern Theory and Method in Group Training	B
36	STD	The Structure and Dynamics of Organizations and Groups	B

In the table 1, we list the sequence number, the name, the title, and the types of samples. From the sequence number, we can know that the total number of the samples in this study is 36. In 'The Name of Samples' column, we define the different names for the samples. 'The title of literature' is the title of each book or academic published papers in journals. There are two types' samples in our content analysis, which are listed in the column of 'The types of samples'. 'B' means book and 'J' means journal. From table 1, we can know there is only one sample was chosen from the journal.

We organise these samples into different categories in terms of their main characteristic. The categories and the distribution number are listed in table 2.

Table 2 Categories of the samples

No.	Categories	The Name of the Samples	Distribution Number	Percentage (%)
1	Group Communication	CL, WG, CST,	3	8.33
2	Group Performance	GPE	1	2.78
3	Group Interaction	IC, ISG	2	5.56
4	Group Process	GP, AGP, DWB, GPC	4	11.11
5	Group Learning	LG, SG, LE	3	8.33
6	Group Dynamics	DG, GD, GC, GDR, STD	5	13.89
7	Group Work	GT, GA, GR, GK, LP, SGW, CMC, GET	8	22.22
8	T-Group	TGT, MTM	2	5.56
9	Group Experience	LTG	1	2.78
10	Group Motives	MG	1	2.78
11	Group Tutoring	GTC	1	2.78
12	Group Skills	JT	1	2.78
13	Inter-group Behaviour	IB	1	2.78
14	Group Decision Making	DM	1	2.78
15	Group Discussion	LTS	1	2.78
16	Others	HSG	1	2.78

The samples can be categorised into 16 issues according to their main topic, which are listed in the column of 'the name of the samples' in table 2. From 'distributed number', we can know how many samples are included in each category. 'Percentage' gives us the further information about the ratio of each category in the total samples. The maximum category of sample is 'group work' (22.22%). 'Group dynamic' (13.89%) is the second maximum category. 'Group process' (11.11%) is the third maximum. 'Group communication' (8.33%) and 'group learning' (8.33%) are the fourth maximum. 'Group interaction' (5.56%) and 'T-group' (5.56%) are the fifth maximum. Others (2.78%), which include 'group performance', 'group experience', 'group motives', 'group tutoring', 'group skills', 'inter-group behaviour', 'group decision making', 'group discussion', and 'others' are the sixth.

THE NORM OF CODING SYSTEM

The norm of the coding is chosen in terms of the purposes of the content analysis in this study. In order to get the essential influencing factors of group learning, the norm of coding system is defined as an open system, which means that there are no predefined factors which can restrict the result of content analysis. This work includes three steps (figure 1).

Step 1: Constructing the primary coding system. The primary coding system is built according to analyze a common group learning process, which is the foundation to build a coding system. Certainly, there are some influencing factors which are connected with group learning process, which are easily gathered through simply analysis. We deal with this work in terms of a framework described by Hackman and Morris (1978). They consider that there are three classes of variables, e.g., effort, performance strategies, and knowledge and skill, are the most powerful proximal causes of group task effectiveness. These variables can be expressed in an 'input-process-output' sequence for different types of tasks. This framework is shown in figure 2.
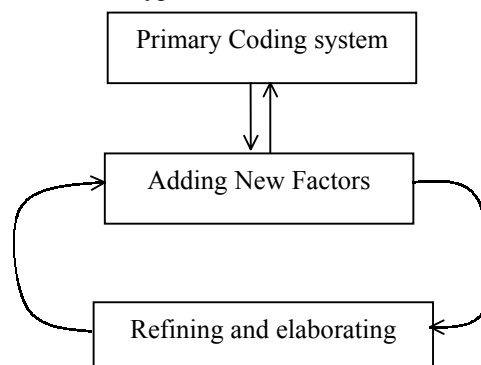
Figure 1 the process to construct the norms of coding system

The primary coding system can be built according to an analysis this framework, which includes some influencing factors to the group performance effectiveness, such as 'group composition', 'group norms', 'group task', 'group interaction', 'group strategies', 'group performance', 'group effectiveness', 'group outcomes', and 'group design'. However, the ideal coding system cannot be acquired according to this way. The primary coding system need following remedy.
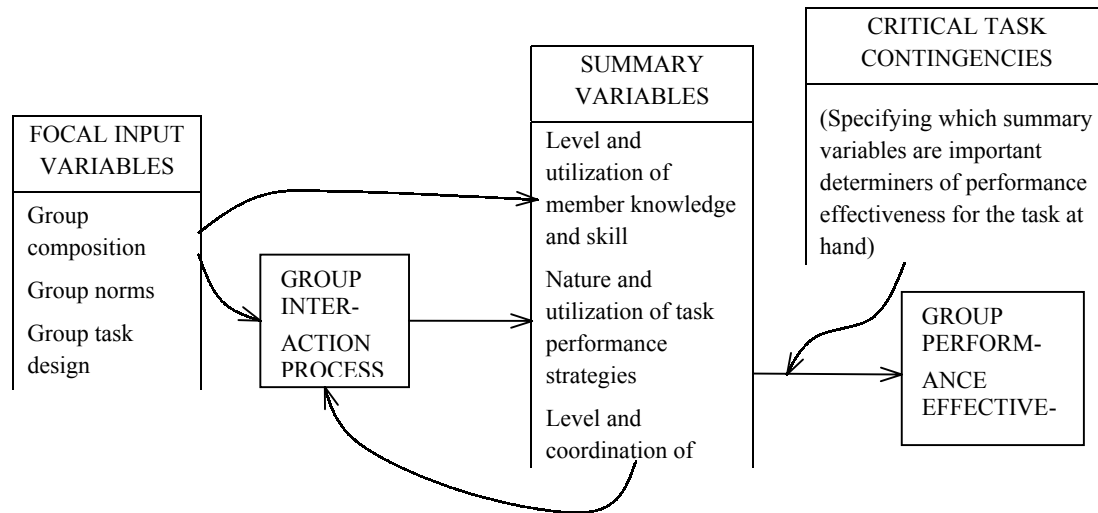

Figure 2 an Input-Process-Output Sequence Framework for Different Types of Tasks

Step 2: Adding new factors into the primary coding system. We define our coding system is a self-expanding and self-maturing system, which means that it can be mended according to adding new factors into the primary coding system. These factors can be analyzed and collected from the specific samples (books and journals). It means that this coding system is opened and not a ready-made coding system can be used into this work. Therefore, this process also can be considered as the way to build a coding system for content analysis.

Step 3: Refining and elaborating the coding system. The primary coding system can be refined and elaborated after continual remediation. The relatively complete coding system will be built during our content analysis. Definitely, if we want to improve the precision of the coding system, further remediation also is needed.

DATA COLLECTION

The data in this research were gathered from the samples through content analysis in terms of the coding system. In order to collect data, we designed a form and named it as "Data Collection Form via Content Analysis."

Generally, data collection in content analysis should be guided by a coding system. Moreover, participants need to be trained first in order to in-depth fully comprehend the coding system. In this study, because there is no predefined coding system, we do not need to collect data according to the general way. Our work in data collection includes three steps.

Step 1: Reading the books and journals (the chosen samples) in order to quote the paragraphs when it expresses the meaning which is connected to the effectiveness of group learning process. For examples:

   CA0006: A supplement to Smith's paper is my own chapter summarising some group behaviour theories for community workers. P14 ------ (Group behaviour) (McCaughan, 1978)

CA0009: It was not appropriate to include detailed discussion of such aspects of group work as composition, size, group development stages, recordings, etc. These have been very adequately written about in the group work texts over the years. P14 ----- (Group work, Group composition, Group size, Group development, Group recording) (McCaughan, 1978)

CAD058: I met, informally, six final year students and raised with them some of the issues that seemed to me to be important: group membership, group stability, seminar rooms, timing of seminars, group size. What follows is an edited version of the transcript of the discussion. P63 --- (Group size, group discussion) (Rudduck, 1978)

The original materials from quotation work includes the index number (CA00**, CAB**, CAC**, and CAD**), quoted content, page number, and influencing factors. This work can be done partly depend on the primary coding system. The paragraph will be quoted when it meet the norm of coding.

Step 2: Tick in the data collection form in terms of the quoted paragraph from the samples. When the quotation work is finished, the original quoted materials can be used to tick mention highlight factors in the data collection form. The frequency of factors does not need to be calculated in the same book or journal. Therefore, the mentioned factors in one book or journal only are recorded one times.

Step 3: Adding new influencing factors into the data collection form. When a 'ticked' work meets the situation where the factor cannot be found in the data collection form, in this case, the factor will be added into the data collection form. The blank cells in the form can be used for this purpose. Meanwhile, the new factor also needs to be added in the coding system, and furthermore, it can be considered as the rule which will be used to deal with the other samples.

DATA ANALYSIS

In order to approach the further analysis, the data collected through content analysis should be given a brief introduction first. We use SPSS as a processing tool to get the data summary. The frequency of each factor can be described in figure 3.
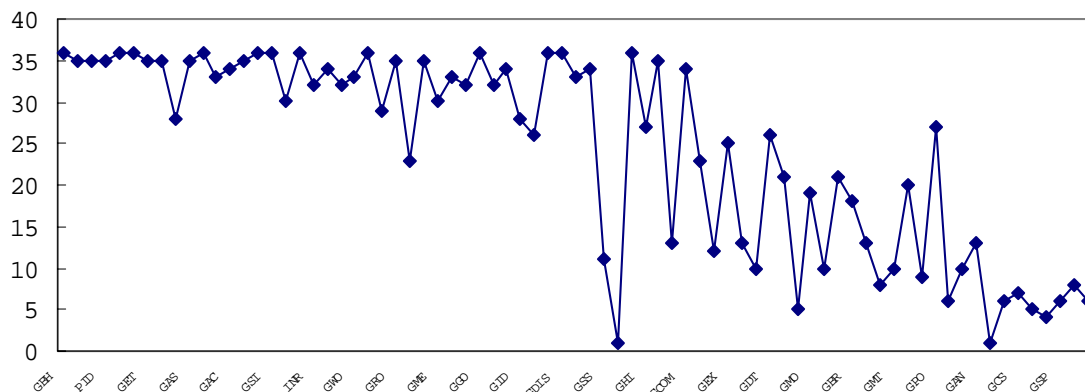

Figure 3 the frequency of influencing factors

In figure 3, the range of frequency is 35. 13 factors are less than 10, which are 'group duration' (GDU, 5), 'individual goal' (IGO, 8), 'individual decision' (IDE, 1), 'individual behaviour' (IBE, 9), 'group efficiency' (GEY, 6), 'individual performance' (IPE, 1), 'group ability' (GAB, 6), 'group consciousness' (GCS, 7), 'group movement' (GMV, 5), 'group controversy' (GCT, 4), 'group progress' (GSP, 6), 'group think' (GTH, 8), and 'group presentation' (GPN, 6). 12 factors are equal to 36, which mean they got full recognized. These factors are GBH (group behaviour), GCO (group communication), GTA (group tasks), GDE (group decision), GSTR (group structure), GSI (group size), GEN (group environment), GCON (group conflict), GGO (group goals), GRES (group resources), GDIS (group discussion), and GLE (group leader). 12 factors are more than 10 (included) and less than 20. 13 factors located 20 (included) and 30. Other 25 factors are more than 30 (included) and less than 36.

The number of frequencies less than 10 does not mean it cannot be used and less validity. It just means that it was referred not too much in these chosen samples. The number is bigger, which means it got more concern by field researchers. In this study, we also need pay more concern and well-analysis for these factors.

RESULTS AND CONCLUSIONS

From this study of literature, we can get the influencing factors of group learning process, which can be described in table 3.

The total influencing factors are 62. The factors in table 4 are ranked according to their frequencies. In order to in-depth analysis these factors in depth, we categorise these factors into four groups, we call Planning, Organising, Learning process, and Evaluation. According to these categories, we can establish that 53.23% influencing factors are related to learning process. We have to confront these factors when a group is used to organized learning process.

Comparing with Hackman and Morris's framework (figure 2), we can design a diagram to present group learning process in terms of integrating influencing factors together. This diagram includes the four components: planning, organising, learning process, and evaluation.

Group planning is the first step of group learning process. The group learning organiser needs to be clear about the group learning task, the objectives, and the other related issues. In the group organising step, the organiser will choose or define a group structure, the optimal group size, a draft agenda, heterogeneous group, and optional group names. Furthermore, group resources also need to be prepared in this stage. Traditionally, group learning can be considered as a learning community. Some elements related to a community can used to organize group, e.g., creativity, norms, belief, and status.

The learning process is the essential component when we organize group learning, which mainly determine the performance of group learning. Some factors must be got well considered, such as interaction, communication, negotiation, skills, strategies, feedback, leader, role play, brainstorming, and motivation. Interpersonal and inter-group relationship also should be balanced carefully.

Evaluation is the last stage in the cycle of our suggested group learning process. Some factors need to be considered, such as performance, effectiveness, outcomes, contributions, history, experiences, and productivity. The purpose of evaluation is to assess group work and to know whether the group learning is successful or not. In this stage, group diagnosis will be used to examine the outcomes and "effectiveness" of group learning. The results can be used to evaluate the group learning process. Meanwhile, these results are adopted to adjust the group planning in order to commence a new group learning process.

Table 3 the influencing factors of group learning process

No.	Name	Freq.	No.	Name	Freq.
1	GFE (Group feedback)	33	32	GCN (Group contribution)	10
2	GBH (Group behaviour)	36	33	INR (Interpersonal relationships)	32
3	GCO (Group communication)	36	34	GAT (Group attitudes)	32
4	GDE (Group decision)	36	35	GSK (Group skills)	32
5	GSTR (Group structure)	36	36	GDY (Group dynamics)	32
6	GSI (Group size)	36	37	GRE (Group rewards)	30
7	GEN (Group environment)	36	38	GME (Group methods)	30
8	GCON (Group conflict)	36	39	RIN (Relationship of inter-group)	29
9	GGO (Group goals)	36	40	GST (Group strategies)	28
10	GRES (Group resources)	36	41	GID (Group identity)	28
11	GDIS (Group discussion)	36	42	GHI (Group history)	27
12	GTA (Group tasks)	36	43	GPO (Group productivity)	27
13	GLE (Group leader)	36	44	GCY (Group community)	26
14	GPE (Group performance)	35	45	GDT (Group development)	26
15	GIN (Group interaction)	35	46	GEX (Group experience)	25
16	PID (Personal identity)	35	47	GAG (Group agenda)	23
17	GEF (Group effectiveness)	35	48	GDI (Group diagnosis)	23
18	GPR (Group process)	35	49	GNE (Group negotiation)	21
19	GAS (Group assessment)	35	50	RPL (Role playing)	21
20	GCOH (Group cohesion)	35	51	GAW (Group awareness)	20
21	GRO (Group role)	35	52	GMO (Group motivation)	19
22	GMI (Group maintenance)	35	53	GBR (Group brainstorming)	18
23	GNO (Group norms)	35	54	GCR (Group creativity)	13
24	GAC (Group activities)	34	55	IEX (Individual experiences)	13
25	GMA (Group management)	34	56	GFO (Group formation)	13
26	INC (Individual contribution)	34	57	GAN (Group action)	13
27	GPS (Group Problem solving)	34	58	GPL (Group planning)	12
28	GCOM (Group composition)	34	59	GSS (Group status)	11
29	GOU (Group outcomes)	33	60	IAT (Individual attitudes)	10
30	GWO (Group work)	33	61	IMO (Individual motivation)	10
31	GCA (Group categories)	33	62	GMT (Group meeting)	10

SUMMARIES

In this paper, we have explored the influencing factors of group learning process through content analysis. 36 typical books and journals were chosen as the samples. We calculated the frequencies of the influencing factors according to whether they were displayed in the samples or not. 75 factors were analysed and 62 influencing factors were extracted in the end. Different frequencies only express the different concerns by different researchers. This methodology cannot certify that a factor with small frequency is not important. This status also indicates that their 'weighing' is different. The influencing factors can be well used to organise group learning processes. Meanwhile, these influencing factors will be used to design a questionnaire to have an in-dept analysis and to model a group learning process in our relevant research in the future. In this sense, this study can be considered as our grounding work. We also described a suggested diagram of group learning processes. It is a cyclic system which can be used to explain how to use these influencing factors to organise group learning.

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