



# Journal of Applied Sciences

ISSN 1812-5654

**science**  
alert

**ANSI***net*  
an open access publisher  
<http://ansinet.com>

## The Role of Non-linear Methods in Teaching English for Medicine: Example of Storytelling

<sup>1</sup>Ataollah Maleki and <sup>2</sup>Samad Sajjadi

<sup>1</sup>Department of English Language, Faculty of Medicine,  
Zanjan Medical Sciences University, Zanjan, Iran

<sup>2</sup>Department of English Language, College of Paramedical Sciences,  
Shahid Beheshti University of Medical Sciences, Tehran, Iran

---

**Abstract:** The aim of the current study was to compare storytelling, a non-linear teaching method of medical education, with a traditional linear method of teaching technical English to the students of medicine. Fifty six students of medicine were randomly divided into two groups and two English for Specific Purposes (ESP) teachers were assigned to teach them: one using the traditional method (class A), the other the storytelling strategy (class B). Everything else being equal, the mean differences between the two groups regarding medical English retention and growth were significant (BM = 56.25 vs. AM = 42.33,  $t = 4.629$ ). The students of class B were also more motivated to learn and participate in class than the students of class A (Motivation = 89% vs. 36.3%; Interest = 92.2 vs. 27%; class participation = 99.4 vs. 25.5%; learning = 97.1 vs. 40.7%). Therefore, the storytelling strategy proved to be a more effective method of teaching medical English than the traditional method.

**Key words:** English for specific purposes, traditional teaching method, storytelling, linear method, non-linear method

---

### INTRODUCTION

English for Specific Purposes (ESP), a branch of English Language Teaching (ELT), is defined as the developing of teaching materials and methods appropriate for the English language learners whose main goal is learning English for a purpose other than just learning the language system (Maleki, 2008). However, Maleki (2005) contends that ESP does not necessarily have to aim at teaching special terminology, jargon or content in a specific field of study, but as Dudley-Evans and John (1998) put it, "... it should always reflect the underlying concepts and activities of the broad discipline.

Regarding ESP teaching, among other questions, two very important questions have always been a matter of controversy: who (the teacher) and how (the method)? Brown (2001) sees ESP teaching as an integrated skills approach, where, the integration of the four skills is the only plausible approach within a communicative interactive framework (Brown, 2001). But, who should teach ESP courses based on "a communicative interactive framework?" Johns and Machado (Cele-Murcia, 2001) believe that ESP teachers have to tackle many challenges, including "ESP content" (special terminology, discourse, etc.) and "successful communication" in a specific

context. Rivers and Temperely (1978) argue that ESP teaching is the job of a specialist in the English language or a specialist in the field "who has a good grasp of English". Maleki (2005, 2008) and Robinson (1991), however, assert that ESP courses should be taught English as a Foreign Language () teachers and that those subject specialists interested in teaching English must attain the necessary qualifications in the teaching of English.

The other very important question concerning ESP teaching is how an ESP course should be taught. This last question which relates to the method of ESP teaching is the main focus of the current study. It will be answered and analyzed in the context of teaching English for medicine.

Traditional ESP teaching has mostly involved linear methods such as reading and translating into the students' first language (official language of their native country) and analyzing medical jargon, where the relationship between what is known and what is unknown is predictable. The end result of such teaching methods has been the development of competence rather than capability. According to Plsek and Greenhalgh (2001), learning takes place in the zone of complexity. The zone of complexity is a point in the middle of competence and

capability. Fraser and Greenhalgh (2001) define competence as "... what individuals know or are able to do in terms of knowledge, skills, attitude and capability as extent to which individuals can adapt to change, generate new knowledge and continue to improve their performance". Competence shapes task familiar, environment familiar part of the zone but capability forms task unfamiliar, environment unfamiliar part of the zone.

Traditional education and curriculum have mainly been planned and designed aiming at enhancing competence contrary to the requirements of the modern complex world. Although developing competence is a necessary part of the zone of complexity, by itself it is not enough for learning to take place. Capability is necessary for the individuals to change, produce new knowledge and enhance performance through feedback. Therefore, as Fraser and Greenhalgh (2001) put it, the learning outcomes in the new curriculum should focus on capabilities, not competencies. Capability, according to them, is achieved by the use of non-linear methods such as storytelling and small group, problem based learning.

The study is significant in two ways. First, it conceives a new approach to ESP teaching and is an unprecedented experience in ESP research; hence, it can lead to a new line of research by ESP experts and possibly the review and/or change of traditional methods of teaching ESP courses. Second, the study re-examines a very important non-linear method, i.e., storytelling in a new context. The method has been used by doctors and nurses in professional training and there is some evidence that clinical knowledge is retained in memory in the form of stories rather than non-integrated facts (Cox, 2001). However, there is little formal research into the ways stories might be used in professional education and service development (Fraser and Greenhalgh, 2001).

The following questions were asked to conduct the research:

- Does storytelling take precedence over traditional teaching of English to students of medicine with regard to their motivation, interest and class participation?
- Does storytelling help students of medicine learn and remember more of medical English compared with the traditional reading, translating and analyzing medical texts and terminology?
- Does storytelling help students of medicine increase and expand their medical knowledge more than the traditional reading, translating and analyzing medical texts and terminology?

The hypotheses below are proposed to answer the research questions:

- Storytelling takes precedence over traditional teaching of English to students of medicine with regard to their motivation, interest and class participation
- Storytelling helps students of medicine learn and remember more of medical English compared with the traditional reading, translating and analyzing medical texts and terminology
- Storytelling helps students of medicine increase and expands their medical knowledge more than the traditional reading, translating and analyzing medical texts and terminology

According to Livo and Rietz (1986), storytelling is "... a problem-solving activity in which the teller must transform abstract memories for story grammar, language, paralinguistic and story content into an integrated, whole, concrete, palpable surface product". As such Andrews *et al.* (2009) assert that a story functions in two ways: it directly facilitates teaching through verbal or linguistic means and indirectly it helps the construction of a sequence of events which are enacted for the learner or by the learner.

Caine *et al.* (2005) maintain that people access, express and retain information and knowledge through storytelling. They referred to brain research to support their argument. According to McDrury and Alterio (2003), learning will be more meaningful, challenging and stimulating if teachers and learners use storytelling for reflective learning. They further claim that storytelling by itself is a theory of learning.

A number of studies have lent support to storytelling as a teaching and learning strategy. Mello (2001) performed a research study on a bi-monthly storytelling-sessions basis over a period of nine months school year. She found that storytelling was enjoyable, entertaining and interesting. She also reported that students' overall learning, listening and interacting skills improved. Mello (2001) is supported by Andrews *et al.* (2009) that in a storytelling-based teaching strategy learners are emotionally engaged or entertained. This would certainly make learning focused and listening enjoyable. Leight (2002) also thinks that storytelling fosters the active listening and reflection skills.

Taylor *et al.* (2001) received positive feedback after using storytelling as a teaching strategy to increase awareness of domestic violence. Considering benefits of storytelling, Forneris and Peden-McAlpine (2006) believe that analysis of stories is an effective way to operationalize critical thinking.

Shieh (2005) in her research study tried to find out whether storytelling enhanced students' knowledge of the course content and whether they considered storytelling as an effective teaching method. She concluded that students reacted favorably to the method and had opportunities to co-create the course content.

## **MATERIALS AND METHODS**

**Participants:** Fifty-six second-year medical students at an Iranian medical university took part in the study. The participants consisted of 32 females and 24 males aged 20-22. They all had passed a general English course examination with a mean score of 16 (range: 0-20). They participated in the study willingly and voluntarily. All were physically and mentally fit and sound and ready during the study period.

**Instrumentation:** A single questionnaire and two types of pretest and a post-test of the medical English course content were developed to measure the effectiveness of storytelling as a teaching and learning strategy for students of medicine as compared to the traditional teaching method. The questionnaire surveyed the students' reaction to and opinion of their experience with the traditional teaching method and storytelling as a teaching strategy. It contained statements related to the research questions. A five point Likert scale with a measure of five being strongly agree and one being strongly disagree was utilized to statistically materialize the respondents' reactions and opinions. As the questionnaire was specifically developed for the current research study, measures of reliability and validity were not available.

The pretests were home-made and intended to measure group equivalence and students' medical English knowledge before the start of the course. The pretest for measuring group equivalence contained items of general English comprising 20 reading comprehension questions, 15 vocabulary questions and 15 grammar questions in four-alternative multiple-choice format. A total possible score of 50 was set for the test with one point allocated to each test item. The reliability of the test had been computed through a test-retest procedure over a period of one month ( $r = 0.89$ ). After consulting a panel of test experts, the content validity of the test was also established.

The pretest for measuring the students' medical English knowledge before the start of the course contained test items on general medical knowledge. These test items comprised rather simple medical texts and vocabulary. Here, again, there were 50 questions in

multiple-choice format with a total possible score of 50. Measure of the reliability for the test was not available because it was developed for this specific study. However, its content validity was established through expert consultations.

The post-test was intended to gauge the students' information retention ability regarding medical English and expansion of medical knowledge. It contained 50 multiple-choice medical English questions and 20 definitions. The former consisted of six reading comprehension passages with five multiple-choice comprehension questions following each. They made up 30 questions of the total 50. Also, there were 20 multiple-choice questions each with a blank space in the stem to be filled in with one of the four technical terms following it. The total score of these tests together with the definitions amounted to a maximum possible score of 70. The latter consisted of specific medical questions related to the cases taught during the course and intended to measure the students' medical knowledge development. Measure of reliability and validity for this test was not available because, as with the questionnaires, it was developed for this specific study.

**Design:** An experimental between-groups design is used to conduct the research. The participants are randomly divided into two equal-number groups and then they are randomly assigned to two different ESP classes with similar teaching programs. One class is taught by the traditional method of teaching English to students of medicine; in the other class storytelling is used as an ESP teaching method.

Two types of pretest are administered to determine group equivalence and measure students' medical English knowledge. At the end of the term, a post-test sampling the content of the course is given to compare group performance.

An opinion/reaction survey questionnaire is also distributed among the members of each group to collect data about their interest, motivation, learning, reaction and experience with both methods.

**Procedure:** Once the participants are randomly divided into two equal groups, they are randomly assigned to two classes: class A and class B. The two classes are then randomly named as traditional class (A) and storytelling class (B). Following this, two long-standing ESP teachers are again randomly appointed to teach the classes. The procedures of class management and teaching are fully explained to them prior to term commencement.

Two weeks before the beginning of the course, two types of pretest are administered. The first which includes

general English reading comprehension and vocabulary test items is given to ensure group equivalence. The second contains medical English reading comprehension texts and medical terminology and intends to measure the students' medical English knowledge. Then, examination papers are collected, corrected and results are analyzed and compared. At the end of the course, a post-test covering the course content is administered to measure students' information retention ability and its durability. After the administration of post-tests, the survey questionnaire is distributed to collect information about the participants' reaction to and experience with each method.

Andrews *et al.* (2009) assert that there are four types of story-based instruction: case-based, scenario-based, narrative-based and problem-based all of which are informed by, embedded in, or organized around a story structure. The instruction in the current study is case-based. In a case-based instruction, according to Barnes *et al.* (1994) in Andrews *et al.* (2009), both the problem and the solution are there and the learner acts as an outsider who observes specific situations happened in the past.

Visiting different hospitals (teaching and clinical), the researcher gathers several disease cases ranging from ordinary to rare cases. The cases are meticulously written in English using medical terminology related to every disease case. The cases include infectious diseases, degenerative diseases, neoplasia, metabolic disorders, hormonal diseases and mental disorders. In class A, starting from ordinary cases, the cases are read out by the teacher, translated into the students' native language and analyzed. Then, unknown medical terms are put on the blackboard to be analyzed according to their roots, stems, prefixes and suffixes. The students are assigned to practice the cases at home and report back next session. The whole semester lasts about four months with classes being held two sessions each week. In class B, on the other hand, the teacher orally narrates the cases with the students listening in a relaxed manner. Before telling the stories, the teacher hands out lists of new words and terms. They are asked to guess the meaning of words from context of the story. Only at the end of each session the students might ask the teacher to explain the meanings of unknown words or use a medical dictionary to look up the meanings of technical vocabulary. Each case presents a problem and the situation involved. The students do not have the main text of the cases, but are allowed to take notes while listening. They are told to think about the stories and report back next session and discuss problems and important points with the fellow members of their group. During the session the teacher acts as a mentor to support his students to solve the problems.

A few days after the end of the course, the post-test is administered and results are compared for both groups. Later, the questionnaire is distributed to learn about the participants reaction to and experience with both methods of teaching.

**Data collection and analysis:** Data is gathered from each of the research instruments: the pretests, the post-test and the questionnaire. The data produced is both ordinal and interval in nature. The ordinal data produced by Likert scale ratings is later subjected to descriptive statistics analysis to reveal central tendencies and variability regarding similarity or dissimilarity of the opinions, reactions and experiences of both groups. The tests produce interval data which allow for group comparisons applying descriptive statistics. T-tests are then used to establish the statistical significance of mean differences between the two groups.

## RESULTS

**Results from the pretest for determining group equivalence:** Results from the pretest for determining group equivalence before the course began are displayed in Table 1. As shown class A's and B's general English knowledge was nearly at the same level with class A's mean result being 36.22 and that of class B's being 36.25 ( $t = 2.321$ ;  $p = 0.05$ ).

**Results from the pretest for gauging medical English knowledge:** Results from the pretest for measuring medical English knowledge before the start of the main course of the study are shown in Table 2. With the mean score of 32.07 obtained by class A and 31.71 gained by class B ( $t = 2.571$ ;  $p = 0.05$ ), approximate equivalence in medical English knowledge between the two groups of the students was confirmed.

**Results from the post-test:** Results from the post-test for measuring the students' medical English retention and growth are shown in Table 3. As seen in Table 3, medical

Table 1: General English equivalence

| Class | No. | Mean  | SD   |
|-------|-----|-------|------|
| A     | 28  | 36.22 | 7.28 |
| B     | 28  | 36.25 | 6.94 |

$t = 2.321, p \leq 0.05$

Table 2: Medical English knowledge

| Class | No. | Mean  | SD   |
|-------|-----|-------|------|
| A     | 28  | 32.07 | 9.50 |
| B     | 28  | 31.71 | 9.95 |

$t = 2.571, p \leq 0.05$

**Table 3: Medical English retention and growth**

| Class | No. | Mean  | SD    |
|-------|-----|-------|-------|
| A     | 28  | 42.33 | 12.49 |
| B     | 28  | 56.25 | 9.39  |

t = 4.629, p < 0.05

**Table 4: Results from the reaction/opinion survey**

| Class | Motivation (%) | Interest (%) | Class participation (%) | Learning (%) |
|-------|----------------|--------------|-------------------------|--------------|
| A     | 36.3           | 27.0         | 25.5                    | 49.7         |
| B     | 89.0           | 92.2         | 99.4                    | 97.1         |

English retention and growth was much higher in class B than class A (CBM = 56.25; ABM = 42.33; t = 4.629, p < 0.05).

**Results from the reaction/opinion survey:** Results from the reaction/opinion survey are shown in Table 4. The table compares the reactions and experiences of both groups with respect to the traditional teaching method and storytelling strategy.

The questionnaire contained ten statements that centered around four major areas of the research: motivation, interest, class participation and learning. Percentages of opinions and reactions to these main points for both groups are displayed and compared in Table 4. Class B's motivation (89%), interest (92.2%), class participation (99.4%) and learning (97.1%) were conspicuously more noticeable than those of class A (motivation = 36.3%), interest = 27%, class participation = 25.5%, learning = 49.7%).

## DISCUSSION

All indications are that storytelling as a teaching strategy takes precedence over the traditional teaching method in an ESP context. This was concluded after we ensured that both groups in the study were equivalent in terms of general English and medical English knowledge before the course, but they changed unevenly after the treatment.

Post-test results (Table 3) are specially conspicuous. The great difference between the means (A = 42.33; B = 56.25), the remarkable gap between the standard deviations (A = 12.49; B = 9.39), the large t (4.629) and a p = 0.05 show how strong the impact of storytelling strategy as a teaching method in an ESP context has been.

These statistics were reinforced and strengthened by results from the reaction/opinion survey. Class B members were 52.7% more motivated than class A members. Also, students in group B were 65.2% more interested in class activities and their class participation was 73.9% higher than that of group A. With learning, there was also a big gap between the two groups according to their own

opinions and reactions. A distance of 47.4% proved that storytelling was indeed an effective strategy for teaching English to medical students and probably to other students in other fields of study.

Accordingly, all the research hypotheses, that storytelling takes precedence over traditional teaching of English to students of medicine with regard to their motivation, interest and class participation, that storytelling helps students of medicine learn and remember more of medical English compared with the traditional reading, translating and analyzing medical texts and terminology, that storytelling helps students of medicine increase and expand their medical knowledge more than the traditional reading, translating and analyzing medical texts and terminology were confirmed.

The results of this study support the findings of other studies that the power of storytelling as a teaching strategy may lie with the fact that it is a non-linear method. It seems that Fraser and Greenhalgh (2001) are true in saying that modern education should develop students' capability rather than competence and this is achieved by the use of non-linear methods such as storytelling. The traditional methods, on the other hand, help develop competence in a task familiar and an environment familiar situation. Plsek and Greenhalgh (2001) asserted that learning takes place in the zone of complexity, which is defined as the middle point between competence and capability. The zone of complexity created by storytelling strategy in class B may have been a significant factor in the enhancement of learning medical English and development of medical knowledge.

Although, the positive effect of storytelling strategy in general education and health care education has been accepted for some time, there is little research into its use and impact in ESP contexts. However, the literature reviewed here supports the findings of the current research study. For example, it appears that Livo and Rietz (1986) are right to say that storytelling is a problem-solving activity in which the storyteller's abstract memories for story grammar, language, paralanguage and story content are transformed into a surface product which enjoys integration and palpability. Therefore, in a storytelling class, language learning is not a step-by-step prefabricated plan, rather, the learner experiences the whole language and puts it to use in real time.

Information retention was shown to be high in class B. This is in line with Caine *et al.* (2005) who claim that people access, express and retain information and knowledge through storytelling. Also, McDrury and Alterio (2003) claim that learning will be more meaningful, challenging and stimulating if storytelling is used to teach and learn supports the findings of the present study.

Mello (2001) found that storytelling was enjoyable, entertaining and interesting. She also found that students' overall learning, listening and interacting skills improved considerably. These findings strongly support the results of our study. Shieh (2005) studied students' reactions to storytelling as a teaching strategy. She, as we did, found that students reacted favorably to storytelling as a teaching/learning method.

Furthermore, the finding of the current study contradicts the research conducted by Kaivanpanah and Zandi (2009). Kaivanpanah and Zandi (2009) showed that focus on form, explicit grammar instruction and depth of vocabulary knowledge were important factors in reading comprehension in EFL contexts. However, in traditional ESP teaching contexts, such techniques have not been effective in medical terminology learning and reading comprehension because such teaching approach falls within the linear educational methods paradigm, which develop competence rather than capability. As the results of the current research leads the way towards a non-linear teaching and learning approach, further research is needed to replicate the study and possibly confirm them.

### CONCLUSION

Linear and non-linear divide is what differentiates between old and new curriculum on one hand and old and new class on the other. ESP courses have been taught by linear methods which are preplanned, text-based and procedural. However, non-linear methods; which involve spontaneity, experience and reflection; have had little or no place in ESP teaching contexts. It is believed that linear methods develop competence, but non-linear methods create capability. Competence by itself is not enough; capability is necessary for individuals to learn and develop. Storytelling is one non-linear method used in education as a teaching strategy. Its usefulness has been established in health care education and other realms, but not in ESP contexts. The present study was designed and conducted to find if storytelling can be used to teach an ESP course and if yes, what impact it may have. The results of the study proved that storytelling is indeed useful and effective in teaching ESP courses.

### REFERENCES

- Andrews, D., T. Hull and J. Donahue, 2009. Storytelling as an instructional method: Descriptions and research questions. *Interdisciplin. J. Problem-based Learn.*, 3: 6-23.
- Barnes, L., C. Christensen and A. Hensen, 1994. *Teaching and the Case Method: Text, Cases and Readings*. Harvard Business School Press, Boston.
- Brown, D., 2001. *Teaching by Principles: An Interactive Approach to Language Pedagogy*. 2nd Edn., Addison Wesley, USA.
- Caine, R., G. Caine, C. McClintic and K. Klimic, 2005. *Brain/Mind Learning Principles in Action*. Morgan Press, Thousand Oaks.
- Cele-Murcia, M., 2001. *Teaching English as a Second or Foreign Language*. Heinle and Heinle, USA.
- Cox, K., 2001. Stories as case knowledge: Case knowledge as stories. *Med. Educ.*, 35: 862-866.
- Dudley-Evans, T. and M. St John, 1998. *Developments in English for Specific Purposes*. Cambridge University Press, Cambridge.
- Fomeris, S. and C. Peden-McAlpine, 2006. Contextual learning: A reflective learning intervention for nursing education. *Int. J. Nurs. Educ. Scholarsh.*
- Fraser, S. and T. Greenhalgh, 2001. Coping with complexity: Educating for capability. *BMJ*, 323: 799-803.
- Kaivanpanah, S. and H. Zandi, 2009. The role of depth of vocabulary knowledge in reading comprehension in EFL contexts. *J. Applied Sci.*, 9: 698-706.
- Leight, S., 2002. Starry night: Using story to inform aesthetic knowing in woman's health nursing. *J. Adv. Nurs.*, 37: 108-114.
- Livo, N. and S. Rietz, 1986. *Storytelling: Process and Practice*. Colorado Libraries Unlimited Inc., Littleton.
- Maleki, A., 2005. Medicine or Medical? *Proc. National ESP/EAP Conf.*, 1: 169-178.
- Maleki, A., 2008. *ESP Teaching: A Matter of Controversy*. ESP World.
- McDrury, J. and M. Alterio, 2003. *Learning Through Storytelling in Higher Education: Using Reflection and Experience to Improve Learning*. Routledge, UK.
- Mello, R., 2001. The power of storytelling: How oral narrative influences children's relationship in the classroom. *Int. J. Educ. Arts*, Vol. 2.
- Plsek, P. and T. Greenhalgh, 2001. The challenge of complexity in health care. *BMJ*, 323: 625-628.
- Rivers, W. and S. Temperely, 1978. *A Practical Guide to the Teaching of English*. Oxford University Press, Oxford.
- Robinson, C., 1991. *ESP Today: A Practitioner's Guide*. Prentice Hall, Hertfordshire, UK., ISBN-13: 9780132840842, Pages: 146.
- Shieh, C., 2005. Evaluation of a clinical teaching method involving stories. *Int. J. Nurs. Educ. Scholarsh.*
- Taylor, J., J. Banks-Wallance and T. Tripp-Reimer, 2001. Storytelling and violence against women. *ABNF J.*, 12: 28-31.