A comparative analysis of the effects of teaching writing in a foreign language with the application of the deductive and the inductive approach

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Abstract

The aim of this paper is to present and analyse the results of the study which focused on measuring the effectiveness of the deductive and inductive approach in teaching writing in a foreign language. The aim will be achieved through the introduction of a relevant theoretical background, the presentation of the research design, a brief description of the research and finally the presentation and analysis of the outcomes.

Keywords: inductive approach, inductive inference, TEFL, EFL writing

Introduction

The aim of this paper is to present and thoroughly analyse the results of a recent study which focused on the impact of the inductive and deductive approach on the quality of teaching writing during a foreign language course.

The aim of the research discussed in the present paper was to evaluate and compare the effectiveness of the deductive and the inductive approach as applied to teaching writing in a foreign language. The paper deals with providing a theoretical background for the study, the description of the design of the research and analysis of its results.

Since there is apparently no data about the application of the inductive-deductive dichotomy in teaching writing in a foreign language, the researcher will need to adapt previous findings from the field of teaching grammar to the field of teaching writing with strong emphasis on inductive inference.

Theoretical background

Before dealing with the research itself, it is necessary to introduce key concepts fundamental for the understanding of the inductive-deductive dichotomy.

The present paper is based on a set of concepts connected with inductive inference and deductive reference. To comprehend the design and administration of the experiment, it is fundamental to understand the processes of inductive inference and deductive reference.

Inductive inference

Inductive inference is the type of reasoning in which a general rule is hypothesized from examples (Angluin and Smith, 1983). In simple words, it "goes from the specific to the general" (Decoo, 1996: 96). It is often compared to the process of first language acquisition (Decoo, 1996), because it "may be used to provide abstract models of the process of scientific inquiry or the process by which a child acquires its native language" (Angluin and Smith, 1983:262).

Angluin and Smith (1996: 237) stated that inductive inference should not be confused with learning, since induction is a type of reasoning — a means of gaining knowledge, whereas learning is the process of gaining knowledge which may occur through reasoning (Angluin and Smith, 1983: 236).

The inductive approach to teaching foreign languages

An introduction of inductive inference to the process of teaching results in inductive learning. In this type of learning, discovery of the rule occurs through the analysis of examples (Nunan, 1999: 309). Inductive learning is the basis of the inductive approach to teaching

foreign languages. The inductive approach can be described and analysed in terms of a systematic sequence of three stages (Stern, 1992) as presented below:

1. **Introduction** — The teacher assigns their students a new task and presents an exemplary way to deal with the task;
2. **Practice** — The students try to complete the task on the basis of their assumptions connected with the given example;
3. **Rule** — Through inductive inference, the students formulate the rule on the basis of their assumptions. The teacher clarifies the rule.

Deduction and the deductive approach to teaching foreign languages

Deduction is the type of reasoning based on reference, i.e. it goes from the universal to the specific. As far as the process of learning is concerned, deduction is based on the analysis of examples in terms of their compatibility with a rule that was previously introduced (Nunan, 1999: 305).

Within the deductive approach, the teacher formulates the rule explicitly to make sure that the students understand it. Then, through deductive reasoning, the students memorize the application of the particular rule on the basis of provided examples. The deductive approach, as well as its inductive counterpart, can be described and analysed in terms of a systematic sequence of three stages, which are presented below:

1. **Rule** — The teacher explicitly formulates and clarifies the rule;
2. **Example** — The teacher introduces an exemplary way to properly apply the particular rule in actual language use;
3. **Practice** — The teacher assigns their students a new task. The students try to complete the task on the basis of the data presented to them by the teacher. The students deduce the solutions on the basis of their interpretation of the previously provided rule (Stern, 1992).

The deductive-inductive dichotomy — modalities (Decoo, 1996)

The inductive and the deductive approach during their didactic application can be realised in a variety of ways. Decoo (1996) refers to these ways as modalities. There are five major modalities of the deductive and the inductive approach to which Decoo (1996) assigned letters from *A to E*. Modality A describes deductive learning, whereas modalities *B, C, D* and *E* refer to inductive learning.

- Modality A — The rule is introduced and explained at the beginning of the learning process and then summarised and memorised on the basis of examples and exercises;
- Modality B — Within this variety of the inductive approach, the students are provided with multiple examples first. Then the discovery of the rule is directed by the teacher who asks key questions concerning the examples, and thus the students are guided to infer and formulate the rule;
- Modality C — The rule is induced and internalized through extensive practice and analysis of a given structure on the basis of a certain set of examples. After the process of inductive inference, the rule is explained and summarized explicitly by the teacher;
- Modality D — The teacher uses material which is structured in such a way that it accelerates the process of inductive reasoning. Through exposure to this material and systematic repetition of a given language pattern, the students will "come to an integrated mastery of the rule" unconsciously (Decoo, 1996: 2);
- Modality E — The rule is inferred exclusively through extensive language practice on unstructured authentic material. Inference resembles "natural acquisition" to the maximum extent.

Modalities D and E played a crucial role in the design of the present research, because the researcher used them as the basis of the modified inductive approach that was the method of teaching during the experiment. The way in which the inductive approach was applied during the experiment can be explained as a combination of these two inductive

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inference modalities. The systematic sequence of stages in this modified variety of the inductive approach was realised through practice on unstructured material, introduction of an example and practice on structured material.

The study

The aim of the present study was to evaluate and compare the effectiveness of the deductive and the inductive approach as applied to teaching writing in a foreign language with a particular focus on the products of this writing. The study was designed especially to provide answers to the following questions:

- Does the quality of final products depend on the approach applied to teaching writing?
- Is the inductive approach more effective than its deductive counterpart when it is applied to teaching writing?
- Does the rate of effectiveness of the inductive approach change for the advanced and the intermediate students when it is applied to teaching writing?

The author hypothesised that the quality of the final product would depend on the choice of the deductive or inductive approach. The researcher also expected that the inductive approach would be more effective than the deductive one when applied to teaching writing; and also, that the rate of effectiveness of the inductive approach for the intermediate learners would be higher than that of the advanced learners, namely, the quality of their works would significantly improve with the switch from deductive to inductive instruction and the quality of works written by advanced learners would not be notably affected by the change of the teaching approach.

Participants

The participants of the experiment were thirty three undergraduate first year B.A. students of English philology at the Institute of English Studies, Faculty of Philology at the University of Łódź during their integrated skills English language course. They were divided into three groups, all of which were instructed by the same academic teacher.

The students were streamed through a placement test conducted by the authorities of the Institute at the beginning of the academic year 2012/2013. They were not chosen by the researcher himself.

Twenty-four women and nine men participated in the experiment. Nine students — six women and three men, represented the advanced level — PNJA Semester 2 according to the evaluation system used within the structures of the Institute of English Studies at the University of Łódź. Twenty four students — twenty women and four men, represented the intermediate (PNJA Semester 1) level.

Procedure

The experiment consisted of two stages — the deductive writing stage and the inductive writing stage. The first stage, devoted to deductive writing, consisted of two sessions. The first session concerned teaching how to compose papers in a new genre. The second session was the productive session, during which the participants composed their own papers in a freshly-learnt genre in the classroom environment under circumstances resembling an exam.

The first deductive writing session lasted ninety minutes. Participants from each group were instructed how to compose a paper in a yet unknown genre through deductive reasoning. This unknown genre was an opinion essay for the intermediate variant of the course and writing an information sheet for the advanced variant of the course.

This session was divided into three parts and conducted according to the systematic sequence of stages characteristic of deductive reference, as presented below:

1. **Rule** — the rules of composition of an information sheet/opinion essay were explained to the students;
2. **Example** — the students were provided with an exemplary opinion essay/information sheet and a set of useful vocabulary;
3. **Practice** — the students completed textbook exercises connected with composing opinion essays/information sheets and wrote their own opinion essays/information sheets in groups.

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The second deductive writing session lasted sixty minutes. During this session, the advanced L2 learners wrote an information sheet and the intermediate L2 learners wrote an opinion essay. The session took place under circumstances resembling an exam — the subjects had to work independently without any external help. The participants could not consult their products during this writing session with the teacher or with one another. After sixty minutes the works were collected. The task for the intermediate group was to write an opinion essay on the following topic:

The dean of our department gave a proposal that all the students should change their shoes before entering the department building. Do you agree with this proposal?

The task for the advanced group was to write an information sheet on one of the two following topics:

1. *How to deal with exam stress?*
2. *How to deal with the symptoms of hangover?*

The second stage of the experiment was devoted to inductive writing. This stage was covered within only one ninety-minute session. The inductive writing session was based on practising a yet unknown genre and teaching it to the participants through the process of inference. During this session, the participants tried to infer a rule and compose a work that would apply to the inferred rule. The circumstances of this session resembled the circumstances of an exam. The students were expected to rely on their own knowledge, experience and creativity.

The application of inductive approach in this session was modified by the researcher in a way that it formed a combination of inductive inference modalities *D* and *E* as defined by Decoo (1996). Thus, systematic sequence of stages in this modified variety of the inductive approach is realised through practice on unstructured material and then introduction of an example to start practice on structured material.

The inductive writing session consisted of five stages which are presented and described below:

1. **Introduction** — the context of the task was introduced with two sets of reading materials prepared for each group. The participants of the intermediate group read an article about

Hangover Heaven service in Las Vegas, USA, advanced students read comments made by the customers about a motel printed out from the Internet;

2. **Task** — the task for the intermediate level was to compose a leaflet which advertises the service on the basis of the information provided in the article, the advanced variant of the task was to write a proposal of changes required to improve the Mountaineer Inn on the basis of customer comments;

3. **Practice on unstructured material** — for thirty minutes both groups of students tried to work without any rules and examples provided;

4. **Example** — after thirty minutes of unstructured practice, the participants were provided with a short information sheet on how to write a good leaflet/proposal;

5. **Practice on structured material** — until the end of the session, the students finished their task on the basis of the provided example.

At first, the teacher provided a context for further tasks. This context material was an article that provided the participants with certain information which they would use in their writing. After twenty minutes of reading, the teacher distributed sheets with a new assignment. This was the examination task presented above. The students were not provided with any additional information except for what was on the sheet. From the moment of distributing the task, the students had thirty minutes to complete it just by themselves not knowing that a sheet with an example would be distributed later on. After another thirty minutes, the students were provided with a short information sheet with pieces of advice on how to write a good leaflet and proposal, respectively. This was a breakthrough in the work of the subjects during this session, because, according to modality *D* by Decoo (1996: 2), providing an example at this point forced rapid inference of unstructured material, so that the material became structured in a way that it accelerated further inferential processes. When the example was provided, the participants were given

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another thirty five minutes to finish the final product. After that, the session ended and the final products were collected for evaluation.

Instruments

There were five criteria on the basis of which the researcher assessed the final products:

1. **Topic** — To what extent did the student fulfil the task?
2. **Text mechanics** — How well is the text constructed?
3. **Lexis** — Are the words used appropriately?
4. **Grammar** — Is the text grammatically correct?
5. **General impression** — Is the text logical, comprehensible, coherent and easy in perception?
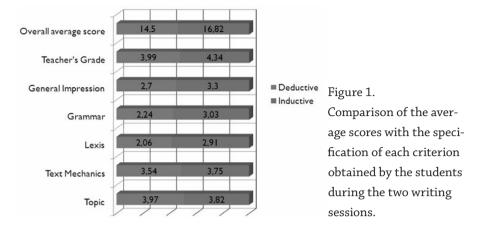
Every criterion was analysed separately. During the individual analysis of each criterion, the researcher rated each work according to a numerical scale adjusted from 0 to 5 (0 for not satisfactory, 5 for excellent).

Another means of assessment of the final products are grades given by the academic teacher. It is necessary to clarify that these grades did not determine the evaluation conducted by the researcher, as they were unknown to him at the moment of this evaluation. These grades were used only as additional data to compare the teacher's assessment based on university standards of the outcomes of each writing session and to calculate the average grade of the group. Grade point averages calculated for both stages of the research could provide information on how efficient the application of the approach was as far as university assessment standards are concerned.

The summative grade based on the sum of all the individual scores for each criterion gave a basis for an overall score (OVR) which could range from 0 to 25. The overall score signified the quality of the work written.

Results

Figure 1 below presents the average scores of the final products by the 33 participants calculated for each criterion with distinction into deductive and inductive writing stage.

Figure 1.
Comparison of the average scores with the specification of each criterion obtained by the students during the two writing sessions.

Quantitative data show that the quality of works written inductively exceeds that of the works written deductively in terms of lexical and grammatical accuracy, structure and general impression. On the other hand, works written deductively scored better on topic, i.e. writers possessed better knowledge of what is expected to be found in their work (cf. Figure 1).

	Inductive	Deductive
Average	16.82*	14.52*
Standard Deviation	3.57	3.84
Standard Error of the Mean	0.62	0.67
Minimum value	10	6
Maximum value	23	21

* a significant correlation which takes the value of $p < 0.05$

Table 1.
Statistical t-test results for the quantitative data calculated for the two average scores obtained during the two writing stages with the specification of detailed data used for calculations.

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The average score for deductive writing is 14.52 with a standard deviation of 3.84 and the average score for the inductive writing is 16.82 with a standard deviation of 3.57. The result of the computed student's t-test for this study was t=3.176 and p=0.003 (p<0.05), which implies that the results of the research are statistically significant (cf. Table 1).

The difference between the rate of effectiveness of the two approaches is much clearer in the case of intermediate learners, who scored an average of 17.17 points during inductive writing and 14.33 during deductive writing. The difference is not that clear in the case of advanced learners who scored an average of 15.88 points during inductive and an average of 15.00 points during deductive writing.

According to the qualitative data gathered during the research, twenty three students — 70 per cent of the subjects — seem to learn writing in a foreign language better through inductive inference. Fifteen per cent of the participants — five students — seem to learn better with the deductive approach. The remaining five subjects (15 per cent of the group) learn equally well with both approaches.

By means of a detailed comparative analysis of the results of the research, it has been made explicit that the inductive approach is highly effective when it is applied for teaching writing in a foreign language.

Summary and conclusions

According to the results, the quality of the final product depends on the approach applied, since the scores for the two approaches were different (cf. Figure 1). Also, as the researcher expected, the inductive approach appeared to be more effective than the deductive one in teaching writing. Finally, the rate of effectiveness of the inductive approach for the intermediate learners differs from that of the advanced learners and indeed, the quality of works by the intermediate learners significantly improved with the change of the approach.

In the present study, the inductive approach appears to be more effective in the group of intermediate rather than advanced learners. For the advanced learners, the difference between the effectiveness of application of the inductive and deductive approach was almost invisible. This

may be explained by the fact that highly motivated adult learners learn effectively through deduction (Rivers, 1975).

During inductive writing, the participants scored lower on the understanding of the topic than during the deductive stage (cf. Figure 1). This may confirm a statement by Tarsoly and Valijärvi (2012) that during inductive learning the aim of the task is not always comprehensible for the learners.

Limitations of the study

The present inquiry, despite yielding statistically significant results (cf. Table 1), may be considered rather as a pilot study for further research than a complete independent work. The overall global outcome of the experiment confirms the domination of the effectiveness rate of the inductive approach. In terms of this study, this result is explicit; however there were only thirty three participants and the number of women as well as the number of the intermediate learners excessively surpassed the number of men and the number of advanced learners. Furthermore, the final products provided by the students were analysed and assessed just by the researcher himself according to a set of criteria which was as well developed by him. If there were more assessors, there would be a possibility that the results might have appeared slightly different.

Suggestions for further study

There are some crucial issues concerning the inductive approach which still need to undergo analysis; for instance, how to reduce the risk for the learners of getting overwhelmed by the process of learning during structured inductive inference and also to increase their sense of security during the process of inductive learning (Tarsoly and Valijärvi, 2012).

As for the field of teaching writing in a foreign language, an experiment similar to the one carried out for this paper could be conducted on other group of subjects; for instance, on younger learners in primary and junior high school. The basis for such a study could be an assumption by Rivers that the inductive approach is especially well-adjusted for young learners (1975).

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