Move 1: Introductions

Establishing a Territory

Move 1 is an opening section that prepares the background for the current study and presents a description of previous research in order to set the stage for the rest of the research paper. Therefore, it is called "Establishing a territory." In this move, researchers often write about what is generally known and what has been previously researched on the topic of the study. This allows the writer to lay a foundation before going into detail about his or her own work. This foundation is important because readers need to be drawn into the research. That is, readers need something to attract their attention and maintain their interest.

There are three steps that can be used to achieve the communicative goal of Move 1:

(1) Claiming centrality, and/or
(2) Providing general background, and/or
(3) Reviewing previous research.

Claiming centrality is a way of emphasizing why and how the topic or problem is part of a broader, significant research area and is worth of investigation. You can be accomplished this by stating that there is a considerable degree of professional interest in the topic or that the problem raises questions for further investigations, emphasizing the importance of the topic, and showing topic prominence in the field.

Here are two examples of how you can claim that there is a considerable amount of interest (Example 1) and importance (Example 2) in the topic:

• Example 1 (Computer Science):
Of interest to our research is facilitating tacit knowledge exchange among knowledge workers.

• Example 2 (Architecture):
The investigation of communal outdoor spaces that children can use and the challenges and freedoms which they allow is therefore of central importance in planning and designing housing areas in our cities.

Words like "timely," "considerable," "numerous," "commonly," "recent," etc. show that the topic is prominent in some way.

Providing general background typically blends different information, which can be theoretical, empirical, and/or other general shared knowledge in the field. In other words, we use this step to build an informational or conceptual frame of reference to support the reader's understanding of the study.

General statements about knowledge, phenomena, practice, or requirements for further progress are expressed in general terms. Consider the following examples:

• Example 3 (Agronomy):
Yield decreases resulting from drought stress depend both on the phonological timing of the stress and on the degree of yield component compensation.

• Example 4 (Food Science):
Its wide consumption by infants and young children makes milk an attractive vehicle for iron fortification.

You can also use words like "typically," "generally," "mostly," "commonly," etc., which are all frequently seen in research articles.

Reviewing previous research, the final step, shows that the researcher has covered the territory by acknowledging what others have already done in order to synthesize and/or critique previous studies on the topic. This step is also essential for demonstrating knowledge and understanding of a topic and acknowledging what has been found or claimed. By reviewing previous research, you will also be supporting the reader's understanding and credibility of the your study (see Example 5 and 6).

• Example 5 (Geological and Atmospheric Sciences):
For example, tree-rings, corals, boreholes, and ice cores all contribute to demonstrate a common trend of increasing global temperature over the past 150 years (IPCC, 2007), with different proxy types contributing more skillfully to a particular spatial or seasonal domain (Pauling et al., 2003).

• Example 6 (Meteorology):
Chang (1993) showed that over the Pacific and Atlantic storm track regions, baroclinic waves exhibit the distinct characteristics of downstream development and occur in wave packets that propagate with group velocities much faster than the phase speeds of individual waves.

Move 2: Introductions

Identifying a Niche

Move 2 is identifying a niche. Authors use this move to identify limitations or incompleteness in the general research topic, indicating an opportunity to make a contribution to the field and gradually shifting the focus of the discussion to the present study. In this move, the author calls attention to a niche in the current research trend and specifies weaknesses and drawbacks in existing research and/or practice by indicating a gap and/or highlighting a problem. Other means of pointing out a niche include raising general questions and/or hypotheses about the topic. Authors generally identify the niche based on their critical analysis of previous research or on existing concerns expressed in the literature. After introducing the niche, the authors may choose to emphasize the need to address it by providing a justification.

Move 2 usually opens with an adversative sentence- connector, which is a word indicating that the following sentence is going to oppose or negate the previous sentence. Frequently, Move 2 is initiated with such signaling words as "however," "nevertheless," "yet," "unfortunately," "but," etc. In addition, the function of Move 2 can be expressed by the following linguistic means:

• Negative or quasi-negative quantifiers: no, little, none (of), (very) few, neither… nor
• Lexical negation expressed by verbs (e.g., fail, lack, overlook), adjectives (e.g., inconclusive, misleading, scarce, elusive, limited, questionable), nouns (e.g., failure, limitation, gap, dearth, lack), or adverbs (e.g., rarely, scarcely, barely, hardly).

There are five steps that can be used to achieve the communicative goal of Move 2:

(1) Indicating a gap, and/or
(2) Highlighting a problem, and/or
(3) Raising general questions, and/or
(4) Proposing general hypotheses, and/or
(5) Presenting justification.

Indicating a gap is the first possible step where authors claim that there is a lack of research on a certain topic or area. That is, this step reveals a gap in the targeted research trend that needs to be filled. You can use this step to underscore the unknown, show connections between what is known in the field and what requires investigation, demonstrate critical evaluation of the current general research topic, and possibly connect to the goals of the present study (implicitly or explicitly).

Here are two examples of how you can show there was little or no research conducted on a specific topic:

• Example 1 (Geological and Atmospheric Sciences):
Little is known of the soils at depth because no major construction has ever been undertaken in this part of the island.

• Example 2 (Genetics):
Furthermore, some of the mutations that alter olfactory learning also have deficits in place learning, although this has not yet been studied exhaustively.

Highlighting a problem clarifies that there is a problem that needs to be solved or requires attention and/or improvement in the particular research trend or domain of practice. You can use this step to signal an existing issue, raise concern about the issue, demonstrate critical evaluation of the issue, and possibly connect to the goals of the present study. Consider the following examples of how authors use this step to highlight a problem existing in their particular research trend:

• Example 3 (Agricultural and Biosystems Engineering):
However, currently, only 6% of the total energy consumption in the US comes from plant and plant-

derived materials.

• Example 4 (Chemical Engineering):
The technology to manufacture synthesis gas with coal or natural gas only as the raw material has been well developed; however, there are still some problems to be resolved.

Raising general questions, the third possible step, is used to raise questions based on the existing body of knowledge in the line of research. There are two ways of raising general questions: asking a direct question (i.e., when the question ends with a question mark) or asking an indirect question (i.e., when the question is presented in the form of a statement). Note that this step deals with raising general questions about the field, not specific research questions of the study presented in the research article (see Example 5 and 6).

• Example 5 (Indirect question, Economics):
One naturally wonders how the interactions among the several aspects of the economy and capital markets change as a result of the increased interaction with the world.

• Example 6 (Direct question, Forestry):
What are the arguments, from a sociocultural or an economic point of view, for the forest owner to choose the spruce monoculture alternative, and how do these arguments agree with public preferences?

Proposing general hypotheses allows the author to hypothesize possible future findings or implications. These are general hypotheses, not the specific hypotheses that the authors are putting forward for the study.

To propose general hypotheses in the introduction, authors typically use subjunctive mood (e.g., if X were Y, then it would affect Z) and words like "may," "might," "likely," "possible," "expected," etc. Similar to the "Raising general questions" step, this step deals with proposing general hypotheses about the targeted research trend, not specific research hypotheses of the current study presented in the research article. The following are examples of how you can realize this step:

• Example 7 (Health and Human Performance):
Therefore, it is possible that basal serum testosterone concentrations, as well as age, may influence the effects of ASD ingestion on serum testosterone concentrations.

• Example 8 (Genetics):
Thus, the idea of a mechanistic singularity in these behaviors might be overstated.

Presenting justification, the fifth and last possible step in move 2, is most commonly stated after indicating gap, problem, question, or hypothesis. In this step, authors may present a positive justification for addressing the issue previously emphasized. In other words, authors present a reason for needing further research or show how the investigation of the topic is worthy or necessary, as shown in Examples 9 and 10.

• Example 9 (Computer Engineering):
This reinforces the need for automatic methods of registering, merging, and abstracting the dense range data sets.

• Example 10 (Biology):
This prompted us to study in more detail the resistance of these rhizobacteria to Pb and Cd and to investigate the effect of the rhizobacteria on barley plants cultivated in soil contaminated with these heavy metals.

Move 3: Introductions

Establishing a Territory

"Addressing the niche" is the last move in the Introduction section of research articles. The move is all about the present study and how the study contributes to the existing research already discussed in move 1 and addresses the concerns discussed in move 2. In this move, authors preview essential elements of the study including research goals, research questions or hypotheses, methodology, and main results. In addition, they can make arguments about the value of the reported work. Finally, this move may contain an outline of the content of the paper to help orient the reader.

Since Move 3 is expected to follow Move 2, it is used primarily to fill in the identified gap and/or to justify any counter-claims that have been previously made in Move 2. However, it should be noted that sometimes authors choose to start the introduction with Move 3, although it is not very common (Swales, 1990).

There are nine steps that can be used to achieve the communicative goal of Move 3:

(1) Introducing present research descriptively, and/or
(2) Announcing present research purposefully, and/or
(3) Presenting research questions, and/or
(4) Presenting research hypotheses, and/or
(5) Clarifying definitions, and/or
(6) Summarizing methods, and/or
(7) Announcing principal outcomes, and/or
(8) Stating the value of present research, and/or
(9) Outlining the structure of the paper.

Introducing present research descriptively introduces main features of the research by providing brief descriptive information to acquaint the reader with the study intent. This step also specifies how the objectives of the study address the niche and/or previously made call for action, and it sets a clear stage for presenting the study in the following sections of the research article.

To accomplish this step, authors can use deictic elements (i.e., words or phrases that can be understood only in context) such as this, the present, we, I, now, here, etc. Consider the following examples of the "Introducing present research descriptively" step.

Here are two examples of how you can accomplish this step:

• Example 1 (Bioinformatics and Computational Biology): *In this paper, we introduce a new motif representation called Scored Position Specific Pattern (SPSP), which has the following advantages.*

• Example 2 (Food Science): *In the present study, the effects of moderate dietary Fe overload in combination with dietary Cu deficiency on oxidative changes in multiple tissue substrates were investigated.*

Announcing present research purposefully declares the main purpose of the study. This step is important for informing the reader of the intentions of the research, specifying how the objectives address previous calls for research in the area, and setting the stage for the presentation of results.

To announce present research purposefully, authors may use direct pointers such as aim, purpose, goal, objective, and to +infinitive structures (e.g., to investigate, to find out, to explore, etc.). Consider the following examples:

• Example 3 (Forestry): *The objectives of this experiment were fourfold: (1) to evaluate the effect of*

four forage mixtures on survival and growth of trees, compared to mowing, herbicides, or no weed management in an alley-cropped system in Iowa; (2) to determine the performance of each forage mixture in tree alleys between seven tree types; (3) to evaluate growth and survival of propagative material (tree seeds vs. seedlings) in this system; and (4) to determine the nutritive value of the forage crop harvested from the tree alleys.

• Example 4 (Animal Science): *The aims of this paper were to quantify the effects of social stressors on the performance of growing pigs, including variation in their ability to cope, and to incorporate these relationships into a more general growth model (Wellock et al., 2003a) to allow the prediction of more complex interactions.*

Presenting research questions is quite straightforward. In this step, the author should present the research questions to specify the focal points of the study. This step is also helpful for highlighting main concepts or keywords and for guiding the reader through the remaining sections of the study.

When using this step, authors clearly state the research questions they set for their study. These research questions can be asked as direct questions (i.e., when the question ends with a question mark) or as indirect questions (i.e., when the question is presented in the form of a statement) (see Example 5 and 6).

• Example 5 (Indirect question, Sociology): *The present research will examine experimentally whether changing stereotypes and attitudes differentially affects the cognitive capacity and motivation needed for successful test performance.*

• Example 6 (Direct question, Psychology): *To explore any differences between the participation protocols, two sub-questions guided our study: (1) Did social construction of knowledge occur in both forums?; (2) Did the participation protocols affect knowledge construction and participation?*

Presenting research hypotheses presents the hypotheses about finding directly relevant to the research objectives or questions of the study. Authors utilize this step to introduce the assumptions to be tested, clarify expectations of the findings, and speculate about potential outcomes.

To present their research hypotheses, authors use verbs like hypothesize, suggest, expect, predict, etc., subjunctive mood (e.g., would expect, could be possible), and modal verbs such as could, might, and may. Consider the following examples.

The following are examples of how you can realize this step:

• Example 7 (Molecular Biology):
Because epigenetic marks are suggested to be involved in sustaining pluripotency, we considered that such developmental properties might be achieved through epigenetic mechanisms.

• Example 8 (Sociology):
We hypothesized that retraining attitudes would elevate motivation in a neutral context but would not increase working memory capacity or performance on complex math problems when cues to threat are present.

Clarifying definitions defines terms or concepts as they are used in the study. By using this step, authors can explain the meaning of used terminology, provide working definitions and/or clarify operationalized constructs, show how the terms or concepts used in the paper coincide with or diverge from similar concepts in the field, and avoid readers' misinterpretation of used terminology. The definitions and/or terms used in the study may either derive from previous research or be coined by the author of the study, as shown in Examples 9 and 10.

• Example 9 (Animal Science):

We use the word stressor with no implication about any specific physiological mechanism.

• Example 10 (Urban and Regional Planning):
Areal interpolation has been defined as "the transfer of data from one set (source units) to a second set (target units) of overlapping, non-hierarchical, areal units" (Langford, Maguire, & Unwin, 1991, p. 56).

Summarizing methods provides a succinct summary of the method/approach used in the study, actions taken, or strategy chosen. When using this step, authors are able to illustrate how the information needed to answer research questions and/or to test hypotheses was obtained, point out the most important aspects of the methodology, preview further detailed description of the methodology, and begin establishing credibility for the research.

The following examples illustrate this step.

• Example 11 (Agricultural and Biosystems Engineering):
Experiments were performed using the bagasse, as it comes from an alcohol/sugar factory, and bagasse screened size 0.248 to 1.397 mm (12–60 mesh) to evaluate the possibility of using the bagasse as it comes from the mills.

• Example 12 (Geological and Atmospheric Sciences):
By linearizing the quartic moveout obtained by Pech et al. (2003) in terms of properly defined anisotropic coefficients, we obtained a closed-form expression for A4 valid in the weak-anisotropy limit.

Announcing principal outcomes briefly announces the principal results of the study. This step shows which findings of the study contribute to addressing the niche, previews further detailed presentation of the results, and possibly transitions to the discussion of the value of the study.

To announce the principal outcomes of their research, authors typically use verbs such as find, show, indicate, reveal, etc. Below are the examples of the "Announcing principal outcomes" step.

• Example 13 (Food Science):
We found that both S. Typhimurium strains, SL1344 and DT104, are capable of resuming exponential growth and normal cell division, recovering from stress-induced injury and recovering maximal SPI-1 expression within 6 h of removal from stress.

• Example 14 (Economics):
This study shows that the information content of world returns influenced emerging market returns prior to capital marketliberalisation.

Stating the value of present research articulates the value of the current study to emphasize the importance of the study and argue that the study and its results present a valuable contribution to the field. See the following examples that demonstrate this step.

• Example 15 (Molecular Biology):
Our studies resolve the recruitment timing of these factors, providing temporal information that sets limits for their functional roles, and identify a strikingly synchronous recruitment among different cells of these factors upon activation.

• Example 16 (Mathematics):
As we will see, it will lead us to reformulate the action minimization problem in a form that is convenient for numerical purposes but will also shed light on some interesting analytical properties of the minimizer.

Outlining the structure of the paper is the final possible step in move 3. In this step, authors preview the structure of the paper and/or its content. Specifically, this step is useful for informing the reader of how the paper is organized, guiding the reader through the content of paper, and allowing the reader to easily locate specific content.

Consider the following examples, in which authors outline the structure of their papers.

• Example 17 (Meteorology):
The remainder of the paper is organized as follows: section 2 includes a description of the data used to identify jet streaks and methodology used to generate the composites. Section 3 describes the results, and section 4 provides a summary and discussion.

• Example 18 (Journalism):
Suggestions for testing and refining specific aspects of the proposed model in future research are included in the final section.