A! Appendix 5

Topic Sentences (Move 1-3)

When reviewing previous literature, the writer needs to relate **_what_** has been done (or proposed) with **_who_** has done (or proposed) it. However, before starting to list individual studies and their authors, it is important that you first introduce them. For this purpose, good writers use the following three sentence patterns as strategies for introducing a topic area.

Strategies 5-7 can serve as **(1)** a **topic sentence** that sets the scene for a listing of previous research work, in which each subsequent sentence uses an _author-prominent_ strategy to support a claim made in the topic sentence; **(2)** as a **"bridge"** between two major topics; **(3)** as a quick summary describing the **current focus** of a research field [Move 1-3]; or **(4)** as the **first part** in a description of **a gap** (Move 2-1] by introducing a topic area that has already been filled by previous research, before going on to identify neglected areas that have received "little" or "no" attention in the literature.

Strategies for introducing previous research:

5. {TIME} [INTENSIFIER] [RESEARCH ACTIVITY] has [VERB -ed] | [TOPIC]
[PURPOSE]

> Recently, much research has been devoted to improving the solubility and retrogradation of starches by reducing their molecular weight through chemical, physical, or enzymatic treatments (Becktel, 1959, Carrol et al., 1987 and Hebeda et al., 1990).

6. {TIME} [INTENSIFIER] progress has been [VERB -ed] in [TOPIC]

> In recent years, much progress has been achieved in the development of biodegradable products using agricultural materials.

7. {TIME} [QUANTIFIER] [RESEARCH ACTIVITY] have (been) [VERB -ed] | [TOPIC]
[PURPOSE]

> A number of METHODS have recently been described to measure this property, including the Tarr-Baker gelometer (Bender, 2009) and the Herbstreith Pektinometer (Zedler, 2013).

A "quick-and-dirty" analysis using Google Scholar revealed that the vocabulary shown on the following pages is commonly associated with these three sentence types of topic sentences.

5. {TIME} [QUANTIFIER] [RESEARCH ACTIVITY] has [verb -ed] + [TOPIC]

Considerable **Much** **Significant**	**research** **work** **effort**	has been **DEVOTED** to has **FOCUSED** on has been **DIRECTED** toward/ at has **ADDRESSED** (the issue of)
Considerable **Growing**	**attention** in **interest** in	has **FOCUSED ON** has been **DIRECTED** toward/ at
Extensive **Numerous** **Many** **Several**	**efforts** **studies** **papers** **investigations**	have been **DEVOTED** to have **FOCUSED** on have been **DIRECTED** toward/ at have **ADDRESSED** (the issue of)

Pie chart: devote 48 %, focus 36 %, direct 11 %, address 5 %
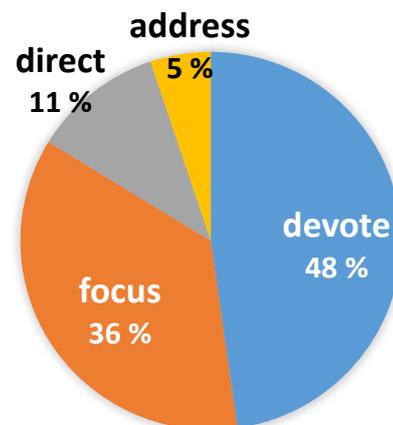
EXAMPLES:

OVER THE LAST DECADE, MUCH **RESEARCH** HAS BEEN **devoted** TO obtaining short pulses at high repetition rates.

IN RECENT YEARS, CONSIDERABLE **EFFORT** has **focused** on evaluating the blocking experienced by "customers" in contending for a commonly shared "resource."

IN THE PAST YEARS, MUCH **EFFORT** HAS BEEN **directed** toward modeling the nonselective multipath fading and shadowing IN personal communications satellite systems

6. [TIME] [QUANTIFIER] progress has been [verb -ed] in [TOPIC]

Much **Considerable** **Significant** **Great** **Substantial**	**progress** **success** **improvement**	has been **ACHIEVED** in **MADE** in **REPORTED** in

EXAMPLES:

CONSIDERABLE progress has been **reported** in wafer size [1], epitaxy [2], and in discrete device and integrated circuit technologies **for** silicon carbide [3].

IN RECENT YEARS, MUCH progress has been **achieved** in the development of biodegradable products **using** agricultural materials as basis.

SINCE THE MIDDLE OF THE 1990S, MUCH improvement has been **made** in the research and applications of workflow.

7. {TIME} [QUANTIFIER] [RESEARCH ACTIVITY] have (been) [verb -ed]

Various A number of Several A wide variety of Numerous Many	approaches methods technologies algorithms solutions	have been	PROPOSED DEVELOPED PRESENTED DESCRIBED	for [PURPOSE] to [PURPOSE]

EXAMPLES:

VARIOUS methods have been described TO MEASURE this property, including the Tarr-Baker gelometer (Bender, 1949) and the Herbstreith Pektinometer (Zedler, 1983), a derivative of the Liiers & Lochmiiller (1957) instrument.

MANY approaches have been developed TO PREPARE chitosan beads, including the water in oil method (Onishi et al., 1996), emulsion-droplet coalescence technique (Tokumitsu, Ichikawa, & Fukumori, 1999), and microemulsion (Andersson & Löfroth, 2003),

A NUMBER OF methods have been developed FOR the cross-linking of chitosan, including chemical cross-linking with glutaraldehyde (Hirano, Yamaguchi, Matsuda, Miura, & Kondo, 1977) and with Mo(VI) polyoxyanions (Draget, Varum, Moen, Gynnild, & Smidsrod, 1992).

A NUMBER OF TECHNIQUES have been proposed FOR PROVIDING runtime performance guarantees while minimizing power consumption.

TO ELIMINATE OR REDUCE harmonics in power systems, SEVERAL METHODS have been developed and put into practice.

NUMEROUS MODELS have been presented TO ESTIMATE the displacement of piezoelectric actuators.

Present Perfect tense

Note that the **topic sentences (5-7)** listed above use the **present perfect tense** to introduce *research activities* as a new topic that will be continued in the following sentences. Table 1 lists the research activities most commonly used as the subjects for topic sentences in engineering fields. Sentences using the present perfect typically announce *recent research or trends* reported from *multiple studies*.

Various methods have been used to construct experimental models for resistive antennas.

Several approaches have been proposed for overcoming these problems **[5], [6], [8].**

Numerous algorithms have been developed for the detection of ECG beats **[4]-[8].**

Many studies have focused on analyzing customer's mobile device usage **[10]-[15].**

Much research has been directed towards feature recognition in human faces **(See [7] for a review)**.

The following **research activities** are typically used in **subject** position with a verb in the present perfect. These sentences function as topic sentences and use sentence **strategies 5-7** listed on the preceding pages.

Algorithm	Framework	Model	**Strategy**
Approach	Heuristic	Procedure	Structure
Architecture	Materials	Process	System
Design	Mechanism	Protocol	**Technique**
Equation	Measure	Scenario	Technology
Extension	**Method**	**Scheme**	Theory
Formula	Metric	**Solution**	Tool

Table 1 Superordinate terms commonly introduced as **research activities** using the *present perfect*.