



专业英文论文修改服务 - > [EssayStar.com](http://EssayStar.com)

# Research Process

A. Erman Tekkaya



Seminar on Scientific Publishing  
January 17, 2008  
Dortmund



## Overview



- **Steps of Research**
- **Scientific Contribution**
- **Classification of Scientific Studies**
- **Literature Survey**
- **Purpose of Scientific Publishing**
- **Relevant Journals**

- **Steps of Research**
- **Scientific Contribution**
- **Classification of Scientific Studies**
- **Literature Survey**
- **Purpose of Scientific Publishing**
- **Relevant Journals**

## Types of Activities

**Scientific  
Fundamental Research**

**Education**

**Applied Research  
(industrial projects)**

- **Need:** What do we need to know what is not known now?
- **Literature:** What knowledge exists?
- **Gap:** Precise gap between need and existing knowledge
- **Proposal:** Model, solution technique, experiment, system to fill the gap
- **Development:** Implementation of the proposal
- **Evaluation:** Testing whether proposal fills the gap (e.g. by comparison with experiments)
- **Further Work:** Suggest further studies as a continuation of the current work

J. M. Allwood

## Golden Rule

**Start your study with a literature research!**

- Steps of Research
- **Scientific Contribution**
- Classification of Scientific Studies
- Literature Survey
- Purpose of Scientific Publishing
- Relevant Journals

## Scientific Contribution

- **Novel work**
- **Transferable Knowledge**
- **Scientific quality:**
  - Based on physical laws
  - Analytical evaluation
  - No fakes

- **New theory**
- **New (innovative) technology (process, machine, tools, materials)**
- **Application of existing theory or technology to a new field**
- **Significant new knowledge that is applicable to different processes**

# Transferable Knowledge

- **Working window of a process**
- **Quantified effect of process parameters (experimental or numerical or theoretical)**
- **Quantitative properties of products (experimental or numerical or theoretical)**
- **A theoretical model**
- **A complete process description**
- **Material properties (experimental or numerical or theoretical)**
- **An applicable software**
- **Others?**

- **Experimental work can be also a scientific contribution!**
- **Simulation by commercial codes are „numerical experiments“ and do not present a „theoretical work“!**
- **The scientific contribution consists of**
  - the analytic interpretation of real experiments and/or simulations, or
  - development of a theoretical model
- **A wrong or insufficient developed theory or experiments not supplying the expected results, are also scientific results and can constitute a dissertation**

- Steps of Research
- Scientific Contribution
- **Classification of Scientific Studies**
- Literature Survey
- Purpose of Scientific Publishing
- Relevant Journals

## Experimental/Practical Work

- Measuring the effect of various parameters by real or „numerical“ experiments and their analytical interpretation
- Design & application of a new process and its evaluation
- Design & application of a new machine and its evaluation

## Theoretical Work





- Development & application of new numerical procedures
- Development of theoretical models

# Overview

- Steps of Research
- Scientific Contribution
- Classification of Scientific Studies
- Literature Survey
- Purpose of Scientific Publishing
- Relevant Journals

- **Scientific Papers**
  - Key Papers: Review papers, universally expected papers equivalent to text books
  - Basic Papers: Papers directly relevant to the work; building blocks
  - Indirect Papers: Papers discussing a related need in a different manner
- **Theses**
  - doctoral
  - Master
- **Patents**
- **Standards**
- **Books**
- **Reports**
- **Web-Sites**

# Databases of Literature

1. **Science Citation Index** 
2. **Scopus** 
3. **Science Direct** 
4. **DOMA** 
5. **Dissertation & Theses Data Bases** (ProQuest-UMI: University Microfilms over 2.3 million theses, The British Library with Theses from UK, USA and Canada)
6. **Patents (DEPATISnet, etc.)**



- Steps of Research
- Scientific Contribution
- Classification of Scientific Studies
- Literature Survey
- **Purpose of Scientific Publishing**
- Relevant Journals

## Purpose of Scientific Publishing

- To distribute the knowledge acquired and hence contribute to the scientific development
- To obtain the rights on the novel contribution
- To receive the comments of peers and improve own work
- To raise own reputation
- To raise reputation of institution, university and country

- **Expected Papers:**

- About 2 years of work: 1 SCI-paper
- At end of work: 1 SCI-paper
- During work: 1 paper in German industrial journals
- During work: 1 to 2 presentations at conferences

- **Authors of Papers:**

- 1. Author: Candidate (and other assistants or students or engineers)
- 2. Author: Division Head (and division heads of other assistants and students or engineers)
- 3. Author: Professor (and professors of institutes of other assistants or managers of engineers in industry)

## Overview

- **Steps of Research**
- **Scientific Contribution**
- **Classification of Scientific Studies**
- **Literature Survey**
- **Purpose of Scientific Publishing**
- **Relevant Journals**

Journal
CIRP Annals
INT J MACH TOOL MANU
J MANUF SCI ENG TECH (ASME)
J MATER PROCESS TECH
STEEL RESEARCH
MATER MANUF PROCESS
J ENGINEERING MANUFACT
CIRP Journal of Manufacturing Science and Technology

Journal
INT J PLASTICITY
INT J NUMER METH ENG
INT J MECH SCI
Z ANGEW MATH MECH
MAT SCI ENG A-STRUCT
COMP MATER SCI
STAHL EISEN