# Learning How to Avoid Plagiarism: A New Approach in Information Literacy Sessions for Computer Science and Engineering Students

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**Abstract.** Plagiarism is one of the main issues information literacy had to address in higher education in the last two decades. In addition to deterrent practices, there is a need to develop instructional concepts that address the problem of poor skills in the correct use of sources that often lead to unintentional plagiarism. In this paper we describe a new approach we implemented in information literacy sessions for computer science and engineering students in order to provide them with a better understanding of the different functions sources can have in scholarly literature. As a novelty in the courses for technical studies we adapted Joseph Bizup's rhetorical framework for research-based writing in the humanities to a German-speaking setting. According to a literature review and our experience we argue that a broader understanding of the sources as rhetorical components of scientific argumentation strongly improves technical degrees students' ability to avoid unintentional plagiarism.

**Keywords:** Information literacy instruction · Higher education · Computer science education · Engineering education · Plagiarism awareness · Unintentional plagiarism · BEAM-framework

## 1 Introduction

In the last twenty years plagiarism has increasingly become one of the more urgent issues of higher education. Easy access to digital information [1, 2] combined with the "ease of information transfer" [3], the 'googleization' of search habits [4, 5] and the undifferentiated perception of digital sources in their validity [6]: these and other factors strongly influence the way students of all fields of studies operate in the process of gathering and implementing information in their assignments. The problem should be considered under two different point of views: on one side we have the issue of academic dishonesty that encompasses cheating in individual courses with a final assessment of some kind and contract cheating. Among the possible triggering factors for academic dishonesty may be work overload and a sense of inadequacy [7] or "family expectations, job market competitiveness and the financial cost of education" [8, pp. 396–397]. Both factors,


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academic inadequacy and financial issues, also play a decisive role among Russian engineering students as showed by a recent study on the causes of plagiarism. Seventy six percent of the students attribute their recourse to plagiarism to the fact that "there are hard-to-understand disciplines, and it is impossible to cope with the required workload" [9, p. 341]. In addition, 56% hinted at the lack of time of working students. On the other side, plagiarism is often unintentional and can arise from poor reading comprehension and paraphrasing skills. Roig's famous "Plagiarism Knowledge Survey" showed that the more complex the source text, the poorer and closer to plagiarism will be the paraphrase [10], thus suggesting that enhancing reading skills through knowledge of the writing conventions and specific terminology of the discipline is essential for the prevention of unintentional plagiarism [11]. The occurrences of academic dishonesty and unintentional plagiarism in both undergraduate and advanced courses make it necessary to apply prevention concepts early in the curricula.

There are different aspects of plagiarism issues in computer science and engineering education. Computer science students are mostly concerned with originality in source coding and may have therefore a different perception of the concept of plagiarism [12], more interdisciplinary fields like user experience design may be affected by the problem in a conventional way. Also the assessment items in computer science courses may differ largely from the traditional ones, including among other items programming, spreadsheets, and web coding [13]. Engineering students' insecurity arises from the particular nature of the sources they are supposed to use [14]. The "Information Literacy Standards for Science and Engineering/Technology" (ILSSET) [15] highlight specific difficulties for technical fields, like peer reviewed literature which is hard to find and to access, knowledge of special institutions, management of raw data and the great variety of source formats, among others "patents, standards, material/equipment specifications, current rules and regulations, reference material routinely used in industry" [15, 1.3]. Engineering students are also involved with ethical, environmental, and safety issues that are connected with the correct application of standards. Dölling [16] showed that the problem of plagiarism in the perception of German universities teachers is closely associated with deficiencies in information literacy (IL). Dölling interviewed academic teachers of different German universities about three domains of IL competences with regard to their importance. In their opinion, the domain covering "critical evaluation of sources and reporting" turned out to be the most crucial. Gaps in this area would explain the students' incapacity to productively combine pre-existing knowledge with original ideas. It is interesting that Dölling's outcomes coincide with the results of a study conducted among full-time professionals in an internationally operating company and engineering students at Purdue University [5]. Phillips' claim that professionals "take a 'least effort' approach to information gathering that prioritizes speed and convenience over authority and comprehensiveness" [5, p. 40] corresponds to German teachers' assumption that engineering students put convenience above quality, thus displaying a lack of critical awareness regarding the use of sources. This may be related to time pressure and the great number of high-stakes examinations [16].

## 2 Prevention of Unintentional Plagiarism Through Enhancement of Writing Skills

Many handbooks and publications on how to prevent or mitigate plagiarism have appeared in the last decades, together with innovative didactical methods conceived either to educate academic integrity or to enhance referencing and citation skills [11, 17].

On one side plagiarism prevention implies ethical education, detecting tools, and deterrent practices and is mostly directed against cheating in course assignments. Ethical policies and codes of conduct have long been the cornerstone of preventive strategies in academia all over the world. Plagiarism detection tools are becoming increasingly sophisticated thanks to the growing development of machine learning [18]. Detection software like Turnitin may even be used in teaching context [19], for example, by including announced plagiarism checks and subsequent feedback on detected plagiarism in writing courses for computer science [20] and engineering students [21]. Deterrent practices may involve the assignment of individual tasks [22].

On the other side plagiarism prevention focuses on the enhancement of referencing and citation skills and is generally carried out by academic libraries and writing centers. The project, "Refairenz," at the university of Konstanz, Germany, emphasises the importance of academic libraries in plagiarism prevention and stands out by offering various practical solutions based primarily on proactive teaching strategies and detection tools support [23]. The library of the Technische Universität München has also developed a set of teaching materials and exercises that covers all formal aspects of referencing, providing a well-functioning example for technical universities [14].

The trend in preventing academic dishonesty goes towards a holistic approach that combines ethical education, deterrent practices, and enhancement of citation skills, thus requiring the collaboration of different units of the same institution [24, 25]. It goes, nevertheless, without saying that deterrent practices and ethical education make less sense in the prevention of unintentional plagiarism deriving from poor reading comprehension and paraphrasing skills. In this field, institutional writing centers can have a great impact on the plagiarism problem in academic contexts. By enhancing the writing skills of the students they not only provide them with essential writing techniques, but also contribute to the development of critical thinking, which is essential for a full comprehension of the concepts of intellectual property. The development of writing skills of engineering and computer science students has long been incorporated in many curricula in universities around the world [26, 27]. Also, writing centers ('Schreibzentren') operate to support teaching, counselling and scientific research in many medium-sized and large German technical universities [28]. While courses at these institutions mainly address the needs of undergraduate students who are starting to write a bachelor's thesis, some offer post-graduate and doctoral degrees as well.

The approach of writing centres in German technical universities is very focused on the didactics of writing: students learn strategies for the integration of sources into their own writing production through exercises on text blocks, wording, and phrasing. These courses are very popular and the outcomes are positive. Students in technical fields who are not accustomed to writing in scientific language benefit from the intensive training and develop a greater awareness for the specific characteristics of scientific and technical

communication that will be essential for their professional future. A good example is the "SchreibLABOR" of the Karlsruhe Institute of Technology (KIT), an interdisciplinary writing centre that hosts various projects promoting scientific writing for bioengineering, chemical engineering, and process technology. Academic libraries are involved in the programs, but generally the topics they cover are limited to research in catalogues and databases, while plagiarism and citation rules are handled by writing instructors. And yet writing skills without in-depth IL are only a partial solution of the plagiarism problem. In the last two decades there has been a growing awareness that IL education should be fully implemented in writing courses; many programs are now based on the close collaboration of teaching librarians with writing instructors or researchers [29]. These projects are, however, generally limited to humanities and social field of studies.

## 3 A New Approach to the Understanding of Scholarly Sources: The BEAM Framework

Each year the Library of the University of Applied Sciences in Ingolstadt (THI) offers an average of 400 information literacy courses to approximately 6000 students from 30 degree programs. Courses for first-year students of the Business School, the Computer Science Faculty and the three Engineering Faculties are offered as part of the curriculum. In five degree programs, students enroll in an introductory course in scientific work techniques between the third and fourth semester. In seven programs preparatory courses for the bachelor thesis are mandatory between the fifth and seventh semesters. Students apply the IL skills they acquire in eleven advanced courses that include mandatory assessment portfolios, (two of which are graded. This is the most comprehensive and integrated IL program in the landscape of the Bavarian universities of applied sciences, It is the result of many years of intense collaboration with lecturers, professors, deans, and university rectors, and a rigorous conceptual work has underpinned it from the outset [30].

We conduct brief surveys at the beginning and at the end of each advanced course to assess the major information needs of the participants, their expectations, and doubts regarding the writing process of a final thesis. We administer the surveys orally, with the aid of flashcards and flipcharts, or online with PINGO[1]). According to these surveys, the students fear most of all to commit unintentional plagiarism. Assessment portfolios always contain a task where citation rules must be applied correctly to sources according to a specific citation style. Regardless of this specific training and graded assessment, the majority of students who attend our private support sessions in the last stages of the bachelor thesis are still greatly concerned with this issue.

The new Framework for Information Literacy for Higher Education (Framework) with its meta-literary and metacognitive approach has confirmed what our intuition has told us over more than fifteen years of IL curricular teaching at THI. That is, in order for students to form life-long IL competences and create a scientific habitus, it is necessary to implement topic- and participant-centered innovative teaching solutions from the very beginning of their studies [30].

[1] https://pingo.coactum.de.

For almost two decades, the teaching library team of the THI has already adopted what the Framework now calls a "renewed vision of information literacy as an overarching set of abilities in which students are consumers and creators of information who can participate successfully in collaborative spaces … extending the arc of learning throughout students' academic careers" [31]. Three frames in particular, "Authority is constructed and contextual", "Information Creation as a Process", and "Scholarship as Conversation", lead to more flexibility of previous standards by reshaping the vocabulary of IL and shifting the focus to a new critical perception of information. The core message is that information must always be contextualised in a multidirectional and multiperspectival communication network [32]. If appropriately implemented in IL instruction, the new frameworks endorse an expansion of the area of competences the teaching librarian should cover in higher education.

Searching for a new didactic approach that would address the problem of unintentional plagiarism from a perspective that is not exclusively normative, we set the condition that it should combine IL with content usually covered by writing centres. As a technical college without a writing centre and with a small team of teaching librarians charged with managing an ever increasing number of curricular courses, a viable solution had to be found. At the same time, we needed to adopt a student-centred method that would help eliminate the insecurities of computer science and engineering students concerning the use of sources, their functions, and their overall raison d'être in scientific works. The innovative framework Joseph Bizup conceived of in 2008 for research-based writing proved to meet our needs best: its strength lies in the new perspective it applies to the analysis of sources, going beyond the traditional categories of primary, secondary and tertiary. Bizup's rhetorical framework was developed to create an "alternative vocabulary" [33, p. 75] for the didactic of writing, introducing the students to the topic of scientific sources in their rhetorical-argumentative functions, in other words with a "language that focuses their attention … on what they as writers might *do* with them" [33, p. 75]. This is a two way-process, that works as well for the reader of scientific literature as for the writer. Bizup used four terms to define the function of a source in a scientific text from the 'passive' point of view of the reader: "Background", "Exhibit", "Argument", "Method" (the acronym "BEAM" being introduced by his students) and four verbs to describe the same sources from the 'active' point of view of the writer, as information to "rely on", to "interpret or analyze", "to engage" and to "follow".

Some writing centres have already adopted a similar approach. KIT considers, for example, the following different uses of sources: as "Adoption of information", "Presentation of research", "Critical approach to research", "Reference to own research" [34, pp. 25–28]. The focus, however, is mostly on the formal integration of the sources in the text flow according to their different functions, a training similar to those aimed at enhancing paraphrasing skills. Such strategies do not cover, among other issues, the problem of what to consider general knowledge or in which section of a text one type of source should be used rather than another. Another advantage of Bizup over traditional methods of enhancing writing skills is that the framework is easily visualized, is equipped with catchy key words, is applicable to both writing and reading exercises, and can be fruitfully combined with IL instruction. Bizup himself developed a concept to integrate his framework with IL elements in a recent handbook [35]. The model has been

positively received and incorporated in courses across different fields of study, mostly in the humanities [36–38] or in interdisciplinary concepts [39]. Nevertheless, Bizup was convinced that the model was applicable also in the context of technical studies:

> BEAM also suits disciplines in which researchers do not customarily refer to their materials as *sources*. BEAM is clearly applicable to literary criticism, but it can also be applied to primary work in the sciences [33, p.76].

## 4 Implementation of the Framework in a Teaching Module for Technical Studies

In order to guarantee the coverage of all courses, the small team of teaching librarians adopted a modular IL structure. The modules cover four main areas: "Systematic analysis of the research topic", "Research strategy and documentation", "Scientific argumentation", "Plagiarism and Citation". The modules are designed so that each of them can be easily adapted to the specific curricula of the degree programs and, in the advanced courses, to the individual contents of the bachelor theses or projects. A continuous and homogeneous transfer of competences is guaranteed by the sequential structure of the modules. One of the core elements of the program is the interactivity. We have striven to maintain this interactivity also during the coronavirus pandemic, transferring the contents of all four modules to e-learning units designed with the tool, Articulate Storyline 360. Early on in the undergraduates courses the student learn to classify and critically evaluate different formats and different contents by directly examining and discussing various specimens of print and online media. We subsequently focus on how information is produced and published. The scope of the lesson is to raise awareness of three important factors in the publication process: time (current vs. established), coverage (general vs. specific) and localization (surface vs. deep web/library). Hereby it becomes clear that a good research strategy starts from the chronological endpoint of the publication process (Figs. 1, and 3).

In the summer 2019 we started to redesign our module, "Plagiarism and Citation", implementing the BEAM framework, at first in the original English version, for international master students in the Engineering and Management degree program. The resulting positive feedback encouraged us to move further and try to adapt the framework also for German students. Since Bizup emphasized the importance of key terms in this alternative nomenclature, it was also essential for us to transfer the concepts into German. We took care so that, on the one hand the key terms did not lose their meaning and, on the other hand, so that they could be used through an equally easily memorable acronym.

Background is all material that the writer considersa fact and inserts in his work as an authoritative element "expect[ing] their readers to do the same" [33, p. 75]. The frame "Authority" places the same degree of importance on the contextuality and relativity of information that must always be interpreted against the background of the community that produces it. Different disciplines "have acknowledged authorities in the sense of well-known scholars and publications that are widely considered 'standard', and yet, even in those situations, some scholars would challenge the authority of those sources" [13]. This perspective can help the student to "develop and maintain an open mind when encountering varied and sometimes conflicting perspectives" [13]. This would

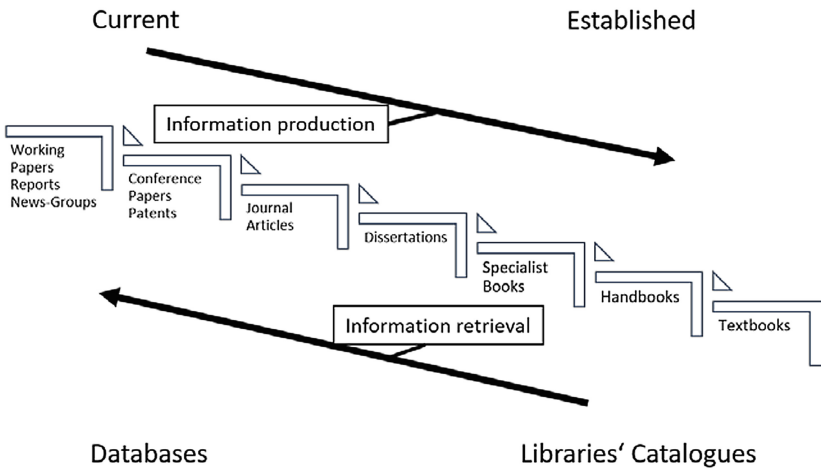


**Fig. 1.** Timeline: Type of publications, information production and information retrieval

meet, for example, the frustration issues students referred to in Phillips' survey on when their respondents found "inconsistent information (different sources claimed different things)" [5, p. 44]. An example of specific sources that can be used as authoritative background is mentioned within ILSSET's performance indicators of IL: professional associations and their publications [15]. Some of these publications and other similar sources may not meet the citation requirements of other disciplines. For example, in the engineering design process this includes "material produced by and about corporations, such as press releases, product manuals, annual reports, trade publications, and industry blogs … Marketing collateral such as brochures, sales sheets, and catalogs" [40, p. 126] and also information gathered through direct contact with experts, practitioner and consultants. Nevertheless, engineering and computer science students need *to rely* on them in order to make clear in the context of which authority they are arguing. In the field of engineering studies the choice of an authority as a reference may also involve essential safety issues, like relying on sources that offers potential solutions and criteria in the engineering design process [41]. We chose the term "Hintergrund" (*background*) for the German model and the verb "vertrauen auf" (*to rely on*, *to trust in*).

Bizup's second key term, "Exhibit", is not equivalent to "evidence", but covers all the materials a research writer is supposed to interpret, analyze, or explain. In most cases this process coincides with the original part of the work. In this respect exhibit information "may need to be constructed with raw data from primary sources or by experimentation" [15, 1.2]. Hereby, notice that "Exhibit" in the BEAM vocabulary overlaps with the conventional term, "primary sources". This materials "may often require manipulation and a working knowledge of specialized software" [15]. Bizup notes that, in the humanities, "rich exhibits may be subjected to multiple and perhaps even conflicting 'readings' … [one] must do rhetorical work to establish their exhibits' meaning and significance" [33, p. 75]. While, at first sight, this approach may seem unsuitable for the

technical disciplines, it can contribute to sharpen students' sensitivity to the challenges of data interpretation. Interpreting data often requires "specific data management expertise" [15, 1.2] and, in a broader sense, the research writer should not underestimate the challenge of correctly and scientifically extrapolating presentable results from the available raw material. Exhibits in these fields can be in very different formats: interviews, measurements, statistical surveys, standardized test data, mathematical theorems, technical reports, and different forms of gray literature. The German term we chose for it, "Untersuchungsgegenstand" (*research object*), is not the exact translation of "Exhibit" but has a closer correlation to the inherent German verb "analysieren" (*analyze*).

The third term, "Argument", is used for source materials that have to be questioned by the research writer. In the process of highlighting the original part of their own work, an author should use sources as argumentative support or as evidence to be confuted, adapted, or expanded. Such sources may contain a position opposite to the writer's approach, nevertheless they must be included in the text if they are pertinent [15, 3.4]. In this sense, the writer "engages" the source. In his original definition, Bizup saw a "genre gap": while academic writers engage with other peers in their own genre, thus establishing a conversation, students do not normally engage with the production of their peers. The frame, "Scholarship as a Conversation", offers a broader vision of this issue, one we can implement in our application of the BEAM framework: here, "novice learners and experts at all levels can take part in the conversation" [31]. Students should consider themselves members of the scientific community, provided that they are aware of its specific conventions and of their own inexperience. IL can help them to acquire the discursive skills and argumentative competences they need to participate to this conversation. For the German version we chose the term "Argumentationsstütze" (*argumentation support*) and the translation of "engage", "sich auseinandersetzen".

Bizup's last item, "Method", refers to information resources that convey procedural rules, frameworks, models, reference tests, investigation procedures, statistical treatments, in short, ways to approach a problem. Methods implies almost always a specific terminology the research writer has to adhere to. "To follow" is the verb Bizup uses to describe the activity related to these sources. From the point of view of the plagiarisms issue, sources related to "Method", may bear the same challenges of a "Background" source, namely the question of whether they must always be cited. Very popular and established methods can "lose their ties to specific sources" [33, p. 76]. Here, IL teaching must operate at the level of a deeper understanding of one of the main BEAM assumptions that the same source can have different functions depending on the use one makes of it. Isoc [42] examines this feature in technical disciplines and distinguishes between approach and application: if I apply a theorem and the object of my research does not require a demonstration of it, I do not have to cite it. If I am looking for a theoretical approach to the theorem and its proof is essential to my research question, then I must cite it in some form. Again, the chosen term in German is a plain translation ("Methode"), as the related verb "folgen" (*to follow*).

The different information formats ILSSET mentions as characteristic for computer science and engineering studies make it necessary to expand the BEAM nomenclature and items to a fifth function. The particular nature of these sources coincides with the formal denomination of the source itself: "standard" ("Normativer Rahmen" – *normative*

*frame*). We have chosen *to adopt* ("verwenden") as the verb to describe what we do with this kind of source. It is a different process from *rely on* and *follow* because adopting a standard means adhering to precise rules, established methods, mandatory criteria, and defined processes. The verb subsumes further meanings that can describe what a research writer does with these documents: *to adjust to*, *to adhere* ("sich ausrichten", "einhalten"). Unlike the other sources, standards may contain mandatory requirements if incorporated into contracts or regulation. Knowledge of the organizations that produce, revise, and update standards, codes, and patents (ISO, ASME, IEEE, VDE among others) is essential for the technical disciplines. Students need also to know that standards are continuously developed. That involves, on one side, the recourse to special search strategies and retrieving channels, on the other side the awareness that licensing and intellectual property undergo a stricter control than in the case of other sources, thus making it harder to retrieve this kind of document. The research writer must also abide to stricter consultation rules. It is safe to affirm that the employment of standards, codes, and patents presupposes a higher level of IL on the part of the users. Adding this item to the BEAM framework is essential for technical disciplines and fills a gap left open in conventional IL training, whereby IL and writing skills are both required to an equal extent. To work with standards and patents from the point of view of the BEAM framework is also a way to deepen the understanding of research as a communication process that needs a particular language in each different field. "Standard[s] are a vehicle of communication for producers and users. They serve as a common language, defining quality and establishing safety criteria" [43]. We used the new umbrella term, "Normativer Rahmen", also for codes and patents that have a similar function.

The resulting acronym, HUMAN is just as easy to memorize in the German language as BEAM is for the English-speaking students.

Finally, we allocated in the five frames the different types of media that students have learned to distinguish in the session on the publication process, as visualized in two of the graphics[2] (Fig. 2) we use to introduce the framework in our courses (Figs. 2 and 3).

The session "Plagiarism and Citation" already contained some introductory reflections on the legal and ethical implications of plagiarism and practical exercises on how to determine whether a text passage may be considered plagiarised or not. With the implementation of the HUMAN framework we also let the students assume one of the two perspectives the model can be applied to, that of the reader. After reviewing precedent didactic implementation of BEAM, we decided that the type of exercise best suited to this purpose and the limited time available for each session (90 min) was a think-pair-share task. This method is particularly suitable for testing the comprehension of a new content. At the same time, peer cooperation makes it easier to immediately verify validity and practicability of the proposed framework. The students are requested to read a short scientific paper related to their field of study and apply the criteria of the framework to the references (Table 1)[3]:

[2] We actually employ different versions of the graphic, this one is more suitable for in class discussions with the help of whiteboards/flipcharts and flashcards.

[3] The task can also be carried out accessing an online paper as a PDF document and using the program markers. The task and the following claims have been translated from German.

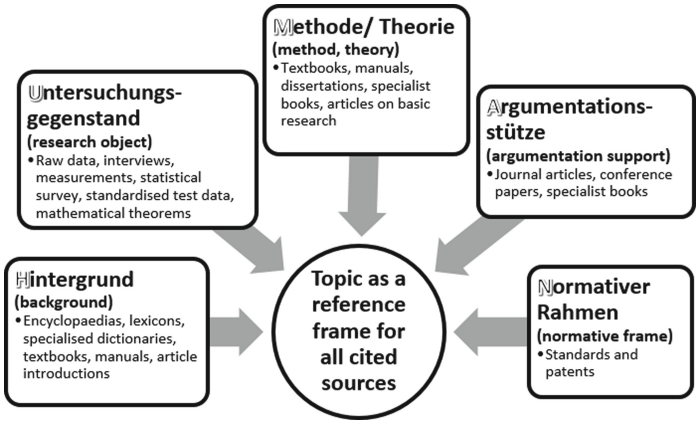


**Fig. 2.** The HUMAN framework: topic as a reference frame for all cited sources

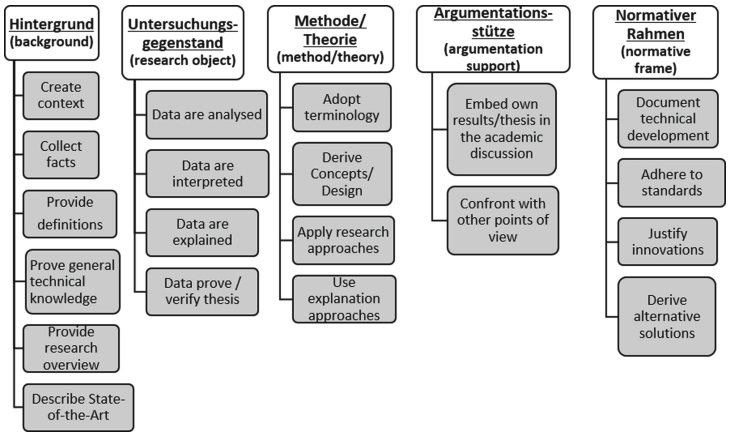


**Fig. 3.** The HUMAN framework: function of sources

**Table 1.** Think-Pair-Share Task: Reading and understanding the function of sources

| Think-Pair-Share Task: Reading and understanding the function of sources |
|---|
| 1. THINK: Read the article individually. Use the single capital letters from the acronym (HUMAN) to mark in the text the different use of the sources. (10 min) |
| 2. PAIR: Discuss your interpretation with your partner. Finally, focus on the aspect you have been assigned and prepare a small presentation (flip chart). (15 min) |
| 3. SHARE: Present your findings and discuss with your classroom. (10 min) |

Meyer and Land [44] threshold concepts lay behind the new Framework ("Transformative", "Integrative", "Irreversible") [45] and are also easily applicable to Bizup's framework. Relying on these concepts, we did not expect predetermined learning outcomes. We wanted "the learner to experience a shift in perspective", to "bring together separate concepts … into a unified whole"; we wanted them to transform a concept into a habit that "once grasped, cannot be un-grasped" [44, pp. 4–5]. From this point of view the following claims (Table 2) should not be perceived as rules but as starting points for a discussion following the HUMAN session. Students can also be invited to conceive new claims for each category. This discussion may foster further reflection that will eventually lead to a deeper comprehension of the value of sources in scholarly contexts.

**Table 2.** Claims to be discussed from the point of view of the HUMAN framework

| General observations |
|---|
| A source should only be cited if it is needed and mentioned in one's own work |
| Every time a source is needed or used with a function, it should be mentioned |
| A mentioned source should always have a function or a scope and must be closely related with one's own research question |
| "*Hintergrund*" |
| A source should be clearly classified according to its information value and contextualised in one's own field of research<br>• A source that is recognized as an authority in one's own field of research should be trusted, but can be questioned. If questioning the source highlights the originality of one's own work, then the source is needed<br>• A source that may contain what in the context of one's own field of study is perceived as common knowledge, then the source is not needed |
| "*Untersuchungsgegenstand*" |
| A source can be valuable/necessary regardless of its format |
| A source can require manipulation in order to be usable |
| "*Methode*" |
| A source can deliver a particular terminology. If this terminology is openly recognized as canonical for the field of research, then it can be left uncited |
| "*Argumentationsstütze*" |
| A source must not be mentioned without being explained, analyzed, interpreted, discussed, refuted, or accepted as support<br>• A source must not be directly cited without comment<br>• A valid source that is pertinent to one's own work must be used, even if it is unfavorable to one's own thesis |
| "*Normativer Rahmen*" |
| A source that is relevant for safety and/or privacy issues must be used and mentioned |

## 5 Conclusion and Outlook

The principal aim of adopting the HUMAN framework in the "Plagiarism and Citation" module is to provide computer science and engineering students with the theoretical background needed to create a critical and responsible attitude towards information sources and thus avoid unintentional plagiarism. In the first two modules of our program the students get a thorough overview of the different formats in which information can be produced, of the suitable information retrieval systems, and of the possible locations of sources. In a subsequent step they learn, through the lens of the framework categories, to determine the need for specific sources. Finally, they learn that there are functional criteria a source must fulfil in order to be cited in their work. Our approach takes into account the fact that, in smaller universities that do not have a writing centre, the teaching library is the main reference point for most of the scientific writing issues. If the organisational aspect is certainly crucial, so is conveying the idea that working with sources is not only a matter of correctly citing but it also implies a deeper understanding of an essential statement of the Framework: the scientific community is a communication space in which every research-based text fits, even those of beginners. Scientific rigour and academic honesty are as much a prerequisite for a seminar paper as they are for a doctoral thesis. Students need to know that the different publication formats are not just formal labels (monograph, journal article, conference paper), but must be considered in the context of an information production process that goes from the first communications of research outcomes to the consolidated knowledge of textbooks. Understanding this process is a prerequisite for efficient information research, especially regarding the problem of information overload on the Web. But this is not enough: if IL instruction is limited to "library stuff" like research or formal citing rules and continue to be perceived as a separate element from the creative writing process, students of technical subjects will be often confronted with feelings of failure. This frustration will result from being forced by the rules of scholarly writing to find and use sources, to perhaps know everything about borrowing books or searching journal articles in a database, but not understand why and how it is necessary to use them, especially if their task is mainly a practical one. This is where the implementation of the HUMAN framework can make a difference. The THI teaching library concept of consecutive and curricular modules strategically spread over the entire course of study creates the ideal setting for this new approach. The next step will be to implement the HUMAN framework instruction in our e-learning concept. IL courses are currently hosted on the platform, Moodle, so that the student's activity can be analysed through a multimodal collection of learner data and learning analytics. Our long-term aim is to conduct a study on the effects of the new plagiarism module on the occuring rate of unvoluntary plagiarism by relating the outcomes of the courses with an analysis of the bachelor's theses of students who have benefited from this new approach during their studies.

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