

# Open-Access Theology: Introducing the *St Andrews Encyclopaedia of Theology's* Digital Publishing Model

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**Abstract:** The *St Andrews Encyclopaedia of Theology (SAET)* is an online multi-author reference work designed as a resource for those engaged with, or wishing to learn more about, the academic study of theology. The *SAET* seeks to provide a suite of comprehensive, fully open-access peer-reviewed articles with no fees or sign-up requirements. In doing so, the editors aim to improve the availability of high-quality information for readers worldwide, especially those for whom access to resources through traditional academic publishing is restricted by cost, lack of institutional affiliation, or limited library resources. This article introduces the *SAET's* digital publishing model, discussing the scholarly and editorial principles that have informed the development of the project. In particular, the article examines the ways in which the *SAET's* commitment to providing quality open-access scholarship has significantly shaped the project's information management and publishing processes.

Technical strategies for widening access to theological knowledge are discussed, focusing on information discovery through the *SAET's* faceted search and in-article hyperlinks as well as available article formats (HTML and PDF). This is accompanied by an explanation of strategies for long-term curation and preservation of theological knowledge within the *SAET*, namely capturing and preserving conceptual information through enriched XML markup and embedded metadata. The *SAET's* article lifecycle is then conceptualized in reference to digital curation and preservation actions described by the Digital Curation Centre's "Curation Lifecycle Model," leading to conclusions about the distinctive character of the *SAET* article workflow, in which curation and preservation of theological knowledge are integrated into its creation and production.

**Attributions:** In order to meet institutional and research funder open-access requirements, any accepted manuscript arising shall be open access under a Creative Commons Attribution (CC BY) reuse license with zero embargo. The authors wish to express their

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## 1) Introduction

The *St Andrews Encyclopaedia of Theology* (SAET) is an online multi-author reference work covering the theology of the major religions from perspectives internal to their practice. The SAET seeks to provide a suite of comprehensive, fully open-access peer-reviewed articles with no fees or sign-up requirements. In doing so, the editors aim to improve the availability of high-quality information for readers worldwide, especially those for whom access to resources through traditional academic publishing is restricted by cost, lack of institutional affiliation, or limited library resources. The SAET is divided into sections for Buddhism, Christianity, Hinduism, Islam, and Judaism, with the Christianity section currently in the most advanced stage of development having received earlier funding.

This article introduces the SAET's digital publishing model, discussing the scholarly and editorial principles that have informed the development of the project. In particular, the article examines the ways in which the SAET's commitment to providing quality open-access scholarship has significantly shaped the project's information management and publishing processes. It briefly treats the SAET's aims, principles, organization, and scope, giving a brief account of the content of the collection. It then situates the SAET within the technical and theoretical parameters of open access. The Digital Curation Centre (DCC) Curation Lifecycle Model is applied to the project to illustrate both its curational aspects and also elements of its work not covered by this model, including the prompting of novel research.

## 2) Establishing an online, open-access theological resource

The *Encyclopaedia* aims to be the premier academic resource for the study of theology, achieving a status comparable to that of the *Stanford Encyclopedia of Philosophy* in its own field.

From the outset, the *Encyclopaedia* adopted a definition of “theology” that could encompass non-theistic religious traditions: “Theology, as we understand it, is inquiry into the nature of divine or ultimate things, grounded in the metaphysical, epistemological, and normative commitments of particular religious traditions or practices” (saet.ac.uk/about). The content of the *Encyclopaedia* is organized around these traditions, with dedicated sections for Buddhism, Christianity, Hinduism, Islam, and Judaism. Commissioning is underway in each of these five sections, with a significant number of articles in the Christianity section having already been published. These sections constitute the only organizational distinction visible to end-users. While heuristic orderings of potential content within sections were used by editors in preparing commissioning, no hierarchy of articles is present on the site. Such initial planning is in any case superseded by organic growth as articles inspire further articles in an unconstrained, online collection.

The *Encyclopaedia* adopted a specially designed editorial structure, intended to build on elements from other successful encyclopedias. In common with *Religion in Geschichte und Gegenwart (Religion Past and Present)*, the major Protestant encyclopedia of the twentieth century, the project appointed between one and five Senior Editors per section, all of whom were leading scholars in their fields. In common with the *Stanford Encyclopedia of Philosophy*, the project intended to appoint subject editors at diverse levels, but a mix of informal advice and the formal, anonymous peer review process proved more effective.

The core of the project is, however, the St Andrews-based team of a Principal Editor and Academic Editors. The Principal Editor is the principal investigator on the grants that fund the *Encyclopaedia*. He leads the overall endeavor, line-managing staff and superintending processes, with a special responsibility for coordinating the knowledge of the Senior Editors, Editorial Board, and Academic Editors to create and curate an authoritative network of interrelated articles that reflect the best theological scholarship.

Academic Editors, who are researchers at approximately the UK lecturer to senior lecturer level, undertake the work of commissioning articles, advising authors, and administering peer review. They are supported in these tasks by the project administrators. In addition, the Academic Editors provide subject-specific advice during the copyediting and production of articles, meaning that articles receive specialist editorial input from conception to publication.

This editorial structure is intended to secure the benefits of both centralization and dispersion. To the greatest extent possible, authors and peer reviewers are freed from

clerical and IT tasks, which have bedeviled other, especially online, projects: whereas in some other projects including the *Stanford Encyclopedia of Philosophy*, learning a markup language of variable complexity has been necessary for every contributor (at least at the revision stage), *Encyclopaedia* authors and peer reviewers work in familiar Word documents. As described in this article, technical responsibilities are handled centrally, while scholarly work is shared over the wide network of expert editors and advisers.

Within its understanding of theology, the *Encyclopaedia's* major principle is that of the internal perspective. This can be achieved by authors writing on subjects relevant to their own religious commitments; it is expressed through a focus on theological concepts, structures, and systems, as opposed to external accounts from the social sciences or the history of religion. Articles are to be conceptually organized and historically informed.

Structurally, an online encyclopedia of theology has several distinct advantages relative to traditional print encyclopedias:

- There are no inherent space restrictions, enabling flexibility in the length and number of articles.
- There is no pre-established sequence of articles or mode of access (e.g., from A to Z) but the possibility of a multidimensional network of articles and subject areas. Keywords, article text, and metadata allow users to navigate the encyclopedia according to their interests, refining search results with various filters.
- Articles can be updated with relative ease, without the need to reissue an entire section or volume of the encyclopedia. Revised versions of the article can be published while the version history of an article remains available to the reader, so that the development of the scholarship is not buried in outdated print editions.

These advantages permit the organic growth of articles and subject areas, as well as innovative clusters, links, and sequences. Such links not only reflect existing theological knowledge in new ways but also enable new theological discovery on the part of readers, authors, and editors.

To this end, the *Encyclopaedia* seeks to utilize the potential of its online format to widen access to theological scholarship. The intended audience encompasses students and their instructors, theological scholars, researchers in adjacent disciplines, clergy and other faith-community leaders, and members of faith communities and the general public who are seeking a more advanced treatment of theological topics than may be available through non-academic sources.

As the faith communities represented and interest in them are worldwide in scope, so the *Encyclopaedia's* audience is global in character. Making theology available for this broad readership requires the *Encyclopaedia* to be accessible to users beyond select academic library services and institutional affiliations. As such, its digital publishing

model is informed by the goals and priorities of open-access publishing—especially the principles of “diamond” open access. While other publishing models cover costs using subscription fees or processing charges, diamond open access does not require fees from readers or authors.<sup>1</sup> Making theological scholarship freely available is a core principle of the *Encyclopaedia*; institutional support from the University of St Andrews and external grant funding have therefore been essential for supporting the project. The *Encyclopaedia*'s commitment to being fully open access is a significant pillar of its mission to make theological scholarship available to a global audience.

### 3) Widening the availability of theological scholarship through open access

In his foundational work on open-access scholarship, Peter Suber advocates thoughtful and sustained engagement with models of academic publishing that make knowledge freely available to all.<sup>2</sup> His case for freely available online scholarship derives much of its persuasive vigor through identifying, and robustly challenging, barriers to knowledge—especially barriers to knowledge in the “internet age” of communication and connectivity.<sup>3</sup> If the goal of academic research is to produce, disseminate, and develop understanding, Suber contends, then the internet provides an ideal platform for sharing information, as long as it is shared *freely*.<sup>4</sup>

The case for open-access academic publishing has been made in the sciences and in the arts and humanities, as well as in the disciplines related to theology.<sup>5</sup> Identifying barriers to knowledge and developing strategies to overcome or diminish them is an ongoing task that involves both those who produce research and those who publish, store, or curate it. As a project that is engaged in the generation, publication, and curation of scholarly content, the *SAET* seeks to be responsive to the challenges of widening access to scholarship throughout its editorial and production practices.

In theology, as in other disciplines, open-access scholarship benefits readers who would otherwise have limited or no access to the research. The readership for open-access theology thus has the potential to be very broad: from theological scholars and tutors to academics

1. Zoé Ancion et al., “Action Plan for Diamond Open Access,” Zenodo, March 2, 2022, 3, <https://doi.org/10.5281/zenodo.6282403>.

2. Peter Suber, *Open Access* (Cambridge, MA: MIT Press, 2012), <https://doi.org/10.7551/mitpress/9286.001.0001>.

3. Suber, *Open Access*.

4. Suber, *Open Access*.

5. See, for example, Martin Paul Eve, *Open Access and the Humanities: Contexts, Controversies and the Future* (Cambridge: Cambridge University Press, 2014), <https://doi.org/10.1017/CBO9781316161012>. In relation to open access in theological subjects, see Kevin L. Smith, “Open Access and Authors’ Rights Management: A Possibility for Theology?,” *Theological Librarianship* 2, no. 1 (June 2009): 45–56.

in adjacent disciplines, undergraduate and postgraduate students, and those outside the academy with an interest in the subject. Due to the distinctive relationship between theology and faith communities, the availability of theological scholarship impacts theological education in all its forms and at all levels. To take an example from the Christian tradition:

Pastors are trained and sermons are preached throughout the world, so the works of biblical scholars and theologians have an audience well beyond the subscription list of any journal. [. . .] [A] theological scholar cannot possibly know about all of the people whose teaching, preaching, and faith journey could be impacted by her article, except in the most abstract sense. Yet all of those people are the true and legitimate audience for theological scholarship.<sup>6</sup>

An obvious barrier to accessing scholarship is financial cost to the reader.<sup>7</sup> When access to research must be paid for, and at the high prices associated with for-profit academic publishing, the financial cost often proves prohibitive for individuals and institutions alike. Rights and usage restrictions represent another, related barrier when research can only be accessed through purchasing either a physical copy or a digital version blocked behind a pay wall, or “borrowing” it for a limited time or certain number of uses.

These barriers may persist even within the scope of open-access publication. In some open-access models, the financial burden is borne (partially or fully) by or on behalf of contributing authors. This is especially the case in “gold” open-access models in which publishers charge authors a fee in the form of article processing charges (APCs) or book processing charges (BPCs).<sup>8</sup> Though avoiding a financial barrier for the reader, the burden is passed to the authors. Within this system, those without access to funding—for instance, because they lack association with an institution—struggle to publish. Some open-access publishers, such as PLOS in the sciences, have grappled with the impact of levying processing charges: “Anyone could read the research we published, but the cost of publishing in an Open [Access] venue was—and continues to be—a barrier for many authors,” writes Sarah Rouhi on the PLOS blog. The post goes on to explain that PLOS is self-reflectively exploring alternative “models [. . .] to systemically address the barriers publication fees pose for many researchers and prove that APCs are not the only way to support Open Access. More sustainable—and equitable—models exist.”<sup>9</sup>

The question of available funding to publish affects all scholars and academic institutions, but some will feel the burden more than others. Those with limited financial

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6. Smith, “Open Access,” 49–50.

7. Suber, *Open Access*.

8. Eve, *Open Access and the Humanities*, 59.

9. Sara Rouhi, “Open Access Doesn’t Need APCs: Our Progress To-Date,” *PLOS Blog*, September 21, 2022, <https://theplosblog.plos.org/2022/09/open-access-doesnt-need-apcs-our-progress-to-date/>.



resources face a significant barrier to publication within models that charge author or reader fees, which disproportionately disadvantage scholars in the Global South and early-career academics, with fewer opportunities to publish in turn affecting their professional recognition and academic career prospects.<sup>10</sup> The diamond open-access model seeks to overcome this barrier, such that absence of cost for authors and readers are one of the hallmarks by which diamond open access is defined.<sup>11</sup>

Open-access works that are without cost to the reader but only accessible through an institutional log-in are likewise inaccessible to some independent scholars and those outside the academy, and even academics from institutions unable to afford subscription costs. The “crisis” in journal pricing in recent decades has severely limited what institutional libraries can afford to offer to students and academics, so that even university-affiliated subject specialists may not have access to many publications in their field.<sup>12</sup> Even open-access scholarship that requires free user registration constitutes a sort of barrier: it requires users to take prerequisite actions before they are permitted to access the information.

There may be good reasons why publishers and repositories require registration, such as security considerations or the enhanced functionality of a user account. User registration may be considered a “soft” or “permeable” barrier, in that most users will be able to fulfill the requirements of a simple sign-up process and so pass through the barrier without significant cost or effort. Nevertheless, some users may be unable or unwilling to complete the additional steps required to access the information, instead choosing to use sources that are more immediately available. When high-quality research resides behind a sign-up process—even if that process and the information it delivers bear no financial cost—it becomes less immediately accessible than the multitude of other sources that may be less reliable.

Beyond financial considerations, barriers to knowledge exist wherever information is hidden, obscured, or presented in a way that makes it difficult to utilize. Thus, for physical and digital media alike, the location and format of the information are both significant factors for its availability. Following Suber’s line of argument, information that is *free to access* (because it involves no cost) but is beyond the reach of most users fails to be *freely available*. This applies to information that is hard to find, or is only available in specialized formats, or can only be accessed in certain locations, such as from within a particular institutional library or network. For those users and institutions whose internet access is restricted, costly, unreliable, or simply absent, open-access web resources may not be freely available however easily discoverable they are online. This places the availability of scholarship firmly within the bigger picture of economic

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10. Eve, *Open Access and the Humanities*, 60.

11. As reflected in the definition of a recent major study on diamond open-access journals commissioned by cOAlition S: Jeroen Bosman et al., *OA Diamond Journals Study Part 1: Findings*, report, March 2021, 7, <https://doi.org/10.5281/zenodo.4558704>.

12. Smith, “Open Access,” 49.

and geographical disparities in access to communications technology and the lack of information equity around the world.

For those with at least some internet access, the ability to find and access information quickly and easily is an important factor in its availability. This is the case for all users, but especially for those with an unstable connection, expensive data costs, or slow download speeds. Scholarly research that is freely and readily available online can be better integrated into the wider information ecosystem, making it easier for users to discover. Freely available resources form part of how people find and interact with information on the web for research of any kind, whether for academic purposes or for everyday queries such as the day's news, a potential purchase, or how to fix a leak. Search engines and services such as Google Scholar can index academic resources, allowing those searching for information to discover those resources as part of a web search. Once a reader is browsing the resource's website, a search interface and hyperlinks are familiar tools by which users can continue to find information of interest.

The motivation of the *Encyclopaedia* to become as integrated as possible into this online information ecosystem is derived from its commitment to widening access to academic theology. Open-access scholarship that is easily discoverable and requires no institutional affiliation or sign-in is no different for the user than various everyday uses of the internet. This does not mean the information cannot, or should not, also be available through institutional libraries—on the contrary, academic library catalogs are ideal digital environments for students discovering open-access information as part of their research. Rather, for information to be widely and freely available, it should not *only* be accessible through these means. The goal is to ensure information is not only *potentially* available but can be found and utilized by those searching for it.

There are practical, financial, and technical challenges involved in developing an open-access publication model, and no digital publishing endeavor is able to address all barriers to knowledge perfectly. However, we have sought to take these considerations seriously when developing a digital publishing model for the *SAET*—not only in its aims, principles, and scope but also in the organization and discoverability of content, feeding into user navigation and experience, and the underlying details of article format, display, and metadata enrichment strategy.

#### 4) Technical strategies for widening access within the *SAET*'s digital publishing model

##### 4.1) *User discovery of theological research through the SAET website*

From a user interface perspective, widening access to knowledge begins with making sure users can find information that is relevant to the knowledge they seek. As a



resource, the *Encyclopaedia* is organized around its search functionality. When users arrive at the [www.saet.ac.uk](http://www.saet.ac.uk) home page, they are presented with a search bar to search by keyword or phrase. A secondary search bar is available on the top right-hand side of every web page to ensure the search function is available to users wherever they may be on the website.

Submitting search terms generates a list of related search results. This list is automatically ordered by relevance, where relevance is determined based on the presence and frequency of search terms in the article title, abstract, keywords, supplementary metadata, and the article text. The search result list may also be sorted by most recent, in alphabetical order, or in reverse alphabetical order to facilitate user navigation of the results.

The format of the search results recognizes that users may need more than just article titles to determine which articles will be of most interest. This is why the search results are presented with additional metadata, including faith tradition and a preview of the article abstract, as well as a snippet of text showing an occurrence of the search terms in the article text. The *SAET*'s search function shows results for all available faith traditions by default. This promotes reader discovery of theological knowledge across traditions, avoiding rigid organizational divisions that would create implicit barriers between content from different faith sections. Readers are thus encouraged to explore how the same or similar topics are covered across conventional boundaries of theological knowledge, allowing them to discover possible connections between topics and methodologies. The inclusion of faith tradition metadata within the search results ensures it remains clear from which perspective each article has been written, and users may refine their search to include articles from only one or more faith traditions according to their interest.

A user may further explore related articles within or across traditions by selecting filters for traditions and topics of interest. For the purposes of the *SAET* search, "topics" are broad predefined subject categories that apply across faith traditions, such as "sacred texts," "ethics," and "philosophy and science." Topic categories allow users to view articles on the search interface according to relevant topics—even without the use of search terms. For example, a student interested in philosophical and scientific interactions in Islamic and Christian theology could select the "Philosophy and science" topic filter and "Islam" and "Christianity" faith traditions. The search results would then display articles from the *Encyclopaedia*'s Islam and Christianity sections on subjects related to philosophy and science.

In addition to the search function, users can view an alphabetized list of available articles through the "Browse" link on the *SAET* home page. In time, they will also be able to view a list of published articles for each faith included in the *Encyclopaedia*. This will allow users to browse the full collection and/or articles for specific faith traditions as an alternative to the search function.

Navigation of information is also integrated into article web pages. The table of contents for each article includes hyperlinked headings that, when selected, jump the reader to the relevant section. Hyperlinked keywords promote the discovery of related entries, as clicking on a keyword allows the reader to view a list of all other articles in the *Encyclopaedia* that have that keyword in common. Articles are connected to one another through hyperlinks to related entries in the main text, making the interconnectivity of theological knowledge visible to users and encouraging the reader to explore those connections (much like a Wiki).

These complementary means of discovering articles—the search, the browse lists, keywords, and hyperlinks—recognize that readers may have different starting points in their desire to access information. Some may arrive at the *SAET* website with a specific topic or keyword in mind; for these users, the search provides a direct and user-friendly method of discovering articles that may be relevant. For readers who are interested in finding out what topics are available and access information that way, the ability to browse the collection offers a similar experience to consulting a table of contents to explore topics of interest.

Each of these methods of article discovery and navigation has been designed as a pathway for reader exploration of topics of interest and related material. In this way, widening access to theological knowledge does not simply take the form of promoting readers' access to articles as self-contained sources of information. Rather, the *Encyclopaedia* allows readers to find knowledge they are actively seeking while also discovering topics, concepts, and connections that may be entirely new to them. Readers are given the tools to pursue these lines of inquiry within and across theological traditions and subject areas, making a breadth of theological information available through the *content* of the *Encyclopaedia's* articles and the *connections* that can be made between them.

#### 4.2) Available article formats

All published *SAET* articles are publicly available in two formats: HTML and PDF. As with many online journals and repositories, readers will have the option to read the article as a web page within their browser (HTML) or save a copy to their device (PDF). PDFs are available without restriction: no payment or registration is required, and users may share, print, or edit the file in accordance with the CC BY-NC license specified on the downloaded article's cover page.

For the editors, the decision to make PDF downloads freely available formed part of the *Encyclopaedia's* broader strategy relating to widening access to theological scholarship. The ability to download resources to local storage is a convenient feature for many readers, allowing them to consult the article at any time or location where internet

access may not be available. PDF reading software often provides the ability for users to annotate documents, which may be particularly useful for students and academics who wish to engage with the article's content in detail and/or distribute the article as course material.

In circumstances where reliable infrastructure or financial circumstances to support regular and sustained internet access are lacking, the ability to save an offline copy becomes a more significant issue for accessing information. Users may require a substantial amount of time with a scholarly resource to read and comprehend it, and the ability to return to information may be important for readers to utilize it in their research. *Encyclopaedia* article web pages and PDFs are designed to be lightweight so that content can be loaded without heavy data transfer that would make accessing articles difficult for those on slow or expensive data connections. Article HTML follows the principles of mobile responsive design, meaning articles remain accessible on smartphones, tablets, and other mobile devices. All of these measures are aimed at reducing or removing barriers to accessing *Encyclopaedia* content in response to the varied technical resources and requirements of a global audience.

#### 4.3) *Enriching and preserving theological information using XML markup*

Although HTML and PDF formats currently offer widespread digital compatibility (working with different browsers, programs, and operating systems) and are therefore readily accessible for users, this may not always be the case. As formats become obsolete, information becomes inaccessible and is at risk of being lost completely. Digital preservation measures are required to ensure the long-term availability of information.<sup>13</sup> For this purpose, the *Encyclopaedia* has developed encoding strategies designed to enrich and preserve theological information contained within articles.

*Encyclopaedia* articles are prepared for publication in XML (Extensible Markup Language) documents. XML was introduced as a standard for encoding “web-friendly” documents in 1998, having been “developed to facilitate the creation, use, and sharing [. . .] of structured information.”<sup>14</sup> XML is widely utilized by publishers and libraries for its ability to structure various levels of data and metadata as well as for the flexibility, interoperability,

13. This point is emphasized by a number of organizations related to information management, and various sets of guidelines for information preservation are readily available. See, for example, the Digital Preservation Coalition's *Digital Preservation Handbook* (2015), <https://www.dpconline.org/handbook>; and the Digital Curation Centre's *Curation Reference Manual*, accessed March 3, 2023, <https://www.dcc.ac.uk/resources/curation-reference-manual>.

14. Timothy W. Cole, Myung-Ja (MJ) K. Han, and Christine Schwartz, *Coding with XML for Efficiencies in Cataloguing and Metadata: Practical Applications of XSD, XSLT, and XQuery* (London: Facet Publishing, 2018), 1.

and longevity of the format.<sup>15</sup> XML is composed in plain text; it is not restricted to a particular programming language or platform. This means it is effective for digital preservation, as it is not restricted to certain proprietary software or operating systems and will remain compatible with new versions of systems and technologies as they progress.

Using a markup language adds informational value to the raw article text as well as the potential for enhanced functionality when presented in other formats (e.g., as an HTML web page). The use of markup allows for flexibility in the presentation of content and the implementation of features that enhance user engagement with the text. Behind the scenes, XML offers tools for the analysis of article content (e.g., through the analysis of markup tags) and the ability to reuse or adapt source XML files for other projects or purposes.

The *Encyclopaedia* follows Text Encoding Initiative (TEI) guidelines for preparing article documents in XML format. TEI guidelines represent a long-standing recognized international standard for “the representation of texts in digital form” especially for “online research, teaching, and preservation” of information.<sup>16</sup> As an open standard with widely available technical documentation, TEI XML provides a method of encoding information in such a way that it could theoretically be read and understood by anyone. TEI XML can capture different kinds of information depending on the type of text it represents: for example, TEI XML for a drama script might mark up elements such as roles, dialogue, and stage directions.<sup>17</sup> The *Encyclopaedia* uses its own customized TEI schema tailored to the project. An *Encyclopaedia* article’s XML file is the source document for the final published article.

The use of TEI XML adds an important stage to the *Encyclopaedia*’s editorial workflow to prepare the text for upload. A plain text version of the article is processed through bespoke software to generate an XML document, encoding the article content within a human- and machine-readable structure and syntax. The program, designed specifically for the *SAET*, has been developed by software engineer Swithun Crowe in the Research Computing Team at the University of St Andrews. It handles not only the article body text but also the article’s copyright and licensing information, table of contents, and a range of metadata fields (see 4.4 below). In addition, the program connects citations and bibliographic entries to the *Encyclopaedia*’s digital bibliographic database. As such, each article’s further reading and works cited sections are populated using data that are actively maintained through bibliographic management software, rather than simply existing as static lists of entries.

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15. Cole, Han, and Schwartz, *Coding with XML*, 1.

16. TEI Consortium, “Text Encoding Initiative,” accessed January 4, 2023, <https://tei-c.org>.

17. Tobin Nellhaus, “XML, TEI, and Digital Libraries in the Humanities,” *portal: Libraries and the Academy* 1, no. 3 (July 2001): 264–265, <https://doi.org/10.1353/pla.2001.0047>.

XML allows an editor to capture conceptual information about the text's content and structure as opposed to simply presentational aspects.<sup>18</sup> Within the body text of an *Encyclopaedia* article, TEI markup is used to tag certain types of content: citations, technical terminology, references to sacred texts, languages other than English, graphics and their attendant captions and metadata, internal and external hyperlinks, and any features of the text with particular formatting requirements (such as block quotations or lists). Article metadata are included in the header elements of the XML document. This, and the conceptual information contained within the TEI XML markup in the article's text, "improves [the document's] identifiability, searchability, and interactivity" when it is published online.<sup>19</sup>

In many cases, though not all, article markup affects how particular features of the text appear to the reader. When the article XML file is uploaded to the *SAET* website, it is processed through an ingestion program that reads the XML and applies a style sheet (XSLT) to produce the HTML web page that will make up the published article.<sup>20</sup> For example, a word marked up in TEI XML as another language will be styled with italics in the final HTML version:

Markup:

In Latin, the word for "God" is <foreign xml:lang="la">Deus</foreign>.

HTML styling:

In Latin, the word for "God" is *Deus*.

Likewise, the article XML forms the foundation for any interactive or navigational features within the article. An in-text reference marked up as a citation will be styled blue in the published HTML version; moreover, the HTML will produce rollover text displaying the full bibliographic reference for that in-text citation. This avoids the need to manually scroll down to the bibliography to find the reference, thus improving the accessibility and immediacy of bibliographic information as and when required by the reader.

Although the XML generation and ingestion programs are effective, at their present stage of development they do not remove the need for editorial interventions once the XML document is produced. The XML needs to be checked for accuracy and completeness—in other words, to ensure that everything that should be marked up is marked up and with the right tags in the correct format. Manual correction of errors is still required, although the systems continue to be refined and optimized for the format and features of *SAET* articles. This takes an investment of time within the editorial workflow. Undoubtedly, it would be quicker simply to typeset the article in basic

18. Nellhaus, "XML," 261.

19. Nellhaus, "XML," 264.

20. XSLT is an acronym for Extensible Stylesheet Language Transformations.

HTML styles. However, the preservation and accurate curation of content represents an important part of the *Encyclopaedia's* strategy for widening access to quality theological information over the long term.

#### 4.4) *Capturing theological information through custom metadata*

Recording metadata is an important step for the curation and preservation of digital documents.<sup>21</sup> Metadata identify information about the document, its content, and its provenance, which will be important for those seeking to understand and use the information in the future. Moreover, the presence of accurate metadata within a document “provides a powerful mechanism for identifying, accessing, managing, and manipulating electronic resources.”<sup>22</sup> Metadata are crucial for the discoverability and preservation of *Encyclopaedia* articles, as both the *Encyclopaedia's* search function and versioning of articles rely on information captured in metadata fields within the article XML. As it is recorded in XML, article metadata can be preserved in a format that ensures interoperability with third-party scholarly indexing systems. This means that, in time, article metadata can be deposited in online academic directories that will allow users to discover *Encyclopaedia* content through the scholarly informational ecosystem.

In view of the significance of metadata for the availability and utility of scholarly information, a metadata strategy has been developed as part of the *Encyclopaedia's* digital publishing model. As well as the standard metadata relating to author, publisher, date of publication, keywords, etc., the *SAET* team has developed custom metadata fields to capture detailed information about article content:

- Faith tradition
- Topic categories
- Key subjects
- Key figures

“Faith tradition” and “topic categories” tags serve as organizational metadata, allowing articles to be presented according to tradition or topic on *Encyclopaedia* web pages and enabling users to filter results on the search interface (as described above in 4.1). “Key subjects” records the subject areas addressed by the article. The “key figures” field lists those scholars and historical figures whose work and/or lives are discussed within the

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21. See Digital Preservation Coalition, “Metadata and Documentation,” in *Digital Preservation Handbook* (2015), <https://www.dpconline.org/handbook/organisational-activities/metadata-and-documentation>.

22. Nellhaus, “XML,” 269.



article. Together, these latter two fields capture information about article content in more granular detail than contained in other metadata fields.

The purpose of these custom metadata fields is twofold: (a) to enhance navigation and article discoverability and (b) to identify connections between articles. The article's content may intersect with any number of subjects that are not its main focus—and therefore not represented in other metadata categories, such as title or abstract—but can nonetheless be used to categorize articles, determine their relevance to user search terms, and identify potential connections between articles that may not be evident except through enhanced metadata capture. In this way, the analysis and filtering of enriched metadata can thus lead to “serendipitous discoveries” regarding theological topics and the relationships between them.<sup>23</sup>

The maintenance of multiple metadata categories for capturing article content requires an investment of editorial time, and not only in terms of data entry. While faith tradition and appropriate topic categories are assigned from short, predefined lists, key subjects and key figures are drawn freely from the article's content. In these cases, human judgment is needed to distinguish between which scholars named in the article are discussed in such a way that they are to be considered “key figures” for the topic and which are merely cited in passing. This is usually evident to a human reader in a way that it may not be to a text analysis program.

These additional metadata categories allow editors to build a more comprehensive profile of an article's content than would be possible simply through title, abstract, and the more concise list of keywords. In time, future content analysis could be used to, for example, compare the number of articles that engage with the work of a particular scholar or, perhaps more ambitiously, map the myriad interconnections between article topics that keywords alone may not reveal. Such interconnections may reveal past influences or form the basis of future research programs and thus represent a meaningful contribution to scholarship.

## 5) The *SAET*'s editorial and production workflow: The article lifecycle

The *SAET* editorial and production workflow is administered across three systems. First, a suite of custom-built relational databases allows editors to track the progress of articles through the various stages of commissioning and the editorial workflow. Second, an online submission platform facilitates *SAET*'s anonymous peer review process.

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23. Getaneh Alemu and Brett Stevens, *An Emergent Theory of Digital Library Metadata: Enrich Then Filter* (Waltham, MA: Chandos Publishing, 2015), 96, <https://doi.org/10.1016/B978-0-08-100385-5.00011-0>.

Third, the administrator portal for the *SAET* website provides a series of essential tools for the preparation and upload of finished articles for publication.

These systems support three workflow stages: commissioning, review, and production. To better situate these stages as part of the *SAET* digital publishing model, it is useful to see how (and to what extent) they adhere to the pattern described by the DCC Curation Lifecycle Model. DCC's model maps best practice "actions" involved in successfully and effectively curating and preserving data.<sup>24</sup> All of these actions pivot around data, "any information in [. . .] digital form" such as a database, website, or digital object.<sup>25</sup> In the case of *SAET*'s publication model, a submitted article (at any stage in the editorial and production workflow) may be considered a digital object.

The publication workflow cannot be fully described by a standard curation model, since the work of the *Encyclopaedia* includes involvement in the creation of research information as well as the curation and archiving of that information in the form of articles. Nevertheless, the comparison between the *SAET* publishing processes and the DCC Curation Lifecycle Model will help to contextualize the *digital* character of *SAET*'s articles, which pass through numerous data handling stages recognized by DCC. The comparison will also demonstrate that the content and curation of these "digital objects" are inextricably tied to their nature as academic articles. Moreover, each individual article serves as a component of a single online work in the form of an encyclopedic publication and so must be curated as its own entity and as part of a greater whole.

For the purposes of this comparison, the editorial and production workflow for articles can be articulated in terms of the DCC Curation Lifecycle Model's "sequential actions." These represent the stages that are to be conducted in sequence for the curation and preservation of data to take place.

### 5.1) *The SAET's processes presented within the framework of the DCC Curation Lifecycle Model*

**a. Conceptualize.** Before an article is written or published, it must first be conceptualized. To use the terms of the DCC model, *SAET* editors work with authors to "conceive and plan" the encyclopedia entry through developing article briefs, provisional tables of contents, and article drafts. This conceptualization stage is research driven: it has generally begun with the *SAET* editors' consideration of the subject matter of theology (as distinct from the current scholarly emphases of the field; these are also weighed), though

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24. Digital Curation Centre, "The DCC Curation Lifecycle Model," accessed January 3, 2023, <https://dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf>.

25. Digital Curation Centre, "DCC Curation Lifecycle Model."

occasionally articles are initiated by potential authors. Subject matter here includes fundamental concepts (e.g., “faith”), for which the research team then selected filters, which might be denominational (e.g., “faith in Roman Catholic theology”), disciplinary (e.g., “Faith in the New Testament”), or scholarly (e.g., “The Faith of Christ/Faith in Christ debate”). The *SAET* editors group these approaches into coherent articles while reflecting on the academic specialisms of potential authors. Where this process leads to specific desiderata for coverage, the *SAET* researchers prepare a brief that is shared with potential authors, approached on the basis of their expertise. These briefs do not specify how to approach the topic but rather what must be covered in order for the *Encyclopaedia* to work toward comprehensiveness.

Authors, once they have accepted the invitation to write, prepare draft abstracts and tables of contents, explaining their plans. These are reviewed by the *Encyclopaedia* editors and may be the basis for a dialogue, after which they may be shared with authors of related entries to promote coherence and avoid undue overlap. Authors are welcome to submit article drafts at any time during the process to receive comments from the editors on their fulfillment of the brief and adherence to publication guidelines, though review of the specific scholarly claims of the article generally waits for the attention of subject-expert peer reviewers.

**b. Create or receive.** As a digital object, the article enters the *SAET* editorial and production workflow when it is submitted by the author(s) via *SAET*'s online submission portal. The data are received as formatted text in a Word file, which may occasionally also contain (or be accompanied by) images.

The commissioning stage of the workflow is a prerequisite to, and runs alongside, the creation and receipt of the article as an extant digital object. Within its current publication model, *SAET* only accepts articles that have been commissioned by an editor. Therefore, the article must be commissioned before it can be successfully received via *SAET*'s submission platform.

**c. Appraise and select.** Appraisal and selection occur through a peer review process. Richard Gartner, introducing the DCC model in his volume on metadata for library collections, describes this stage as “an appraisal of [the object’s] worth and consequent selection or rejection.”<sup>26</sup> For *SAET*, the article is not appraised for its “worth” in an

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26. Richard Gartner, “Planning a Metadata Strategy: Basic Principles,” in *Metadata in the Digital Library: Building an Integrated Strategy with XML* (Bristol, UK: Bristol University Press, 2021), 26, <https://doi.org/10.29085/9781783304868.003>.

arbitrary or abstract sense but for how well it meets the academic standards and article format required by *SAET* as a scholarly theological encyclopedia.

**d. Ingest.** Once accepted, the article is incorporated (“ingested”) into the collection. The DCC model defines ingestion as the “[t]ransfer [of] data to an archive, repository, data centre or other custodian.”<sup>27</sup> In the case of *SAET*, ingestion is not one action but a multi-stage production workflow. The submitted article files are transferred into the internal *SAET* file system and converted into formats required for publication. As well as being prepared for publication in a technical sense, the article is made ready for publication through copyediting to ensure that its information is conveyed clearly, accurately, and in accordance with *SAET* editorial style.

**e. Preservation action.** Before the article is made available for publication on the *SAET* website, it is subject to a series of editorial and technical checks. In the words of the DCC model, these actions “ensure that data remains authentic, reliable and usable.”<sup>28</sup> For example, the article text is proofread to correct typographical and stylistic errors, preserving the reliability and utility of the information it contains. From the technical perspective, the XML document structure is validated prior to publication to ensure the article file conforms to TEI standards.

A CC BY-NC license is applied to each article, as agreed with the author(s). This provision protects the authorial rights of contributors, who retain copyright for their work, while making it possible for third parties to copy and store *SAET* articles for preservation purposes (among other uses permitted by the specified Creative Commons license). As part of the *Encyclopaedia*’s preservation actions, content is prepared in formats that make it possible for third-party repositories and web archives to easily index and make copies of published articles for preservation. Likewise, the availability of a PDF version of the article encourages individuals to download and store their own copy for accessing in the future. At the same time, to maintain the integrity of the collection and the association of current articles and past versions, the *Encyclopaedia* asserts its database rights to resist its wholesale replication elsewhere.

The *Encyclopaedia*’s preservation actions are undergirded by the commitment of the University of St Andrews to host the *SAET* website and store its data indefinitely,

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27. Digital Curation Centre, “DCC Curation Lifecycle Model.”

28. Digital Curation Centre, “DCC Curation Lifecycle Model.”

including back-end files. This institutional support is crucial in providing a stable technical infrastructure within which the *Encyclopaedia* may ensure its ongoing functionality and secure archiving of articles.

**f. Store.** The finished article is stored on the server, along with any supplementary files (e.g., bibliography files or images). Submission files, publication files, and associated metadata are stored within *SAET* file managers and internal editorial databases. If a new version of an article is published, the previous version(s) will continue to be stored on the *SAET* website so as to remain accessible for readers. As part of the *Encyclopaedia*'s commitment to the ongoing availability of theological knowledge, copies of the source XML documents will ultimately be submitted to an open-source third-party repository for long-term storage and preservation.

**g. Access, use, and reuse.** The article is published on the *SAET* website where it can be accessed, used, and reused. In line with *SAET*'s open-access policy, readers may access the article freely by browsing or searching the *SAET* website. Additionally, articles are published under a Creative Commons license that allows not-for-profit use, dissemination, and adaptation of article content as long as appropriate attribution is given. Authors, as the creator and copyright holder of the work, must be cited, along with a link to the original article. Readers may access, use, and adapt material in the published HTML or PDF formats. *SAET* editors may additionally access, use, and reuse material from the source XML file from which the HTML and PDF documents are generated. A single source file for both HTML and PDF generation streamlines the process of creating new versions of the article, as only one document needs to be edited rather than two. Editing a single source reduces the risk of discrepancies being accidentally introduced into the HTML and PDF documents for the same article, ensuring the reliability of the article in both HTML and PDF form.

**h. Transform.** In the DCC model, “transform” means to “create new data from the original” (thus leading back to the “create or receive” stage in the cycle).<sup>29</sup> Transformation occurs in several interrelated ways for the *Encyclopaedia*. Authors are encouraged to revise or update articles to reflect developments in the field. The published article text and source XML files serve as the basis for these updates on both a conceptual and a technical level.

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29. Digital Curation Centre, “DCC Curation Lifecycle Model.”

Data may be extracted and transformed digitally from the source XML document or the HTML and PDF versions into new formats and for various purposes. As the *Encyclopaedia* develops, XML will enable versioning of articles as they are revised, capturing change-log metadata and allowing new versions of articles to be published without loss of data from previous versions (which will be archived, as above). Article content and meta-data can be analyzed to reveal trends and conceptual insights concerning the treatment and structuring of theological knowledge. The TEI XML encoding of the article source documents enable automated, semi-automated, and manual analyses of *Encyclopaedia* content.

New data are created through the cross-referencing hyperlinks contained in the articles, establishing a network of relations between data. These connections bring articles and their varying premises, approaches, and definitions into conversation, serving as a starting point for further research and informing the editors' ongoing conceptualization and curation of theological knowledge within the *Encyclopaedia*.

Throughout the workflow, the development of the article content feeds back into the *Encyclopaedia's* research-led processes to prompt the creation of new theological information. This process of creating new information is continuous within the *Encyclopaedia's* overall publishing model, as new articles are generated simultaneously with and in response to the production of others.

## 5.2) Analysis

Like many online scholarly publications, *SAET* articles are “born digital.”<sup>30</sup> They are digital objects: they are conceived, appraised, published, stored, used, adapted, and transformed through digital means. As part of the task of publishing an open-access digital resource for long-term use and availability, the project's workflow incorporates curation and preservation actions as described by the DCC Curation Lifecycle Model. At the same time, the *Encyclopaedia* workflow exceeds the bounds of that model because its processes combine scholarly engagement with article content. The *Encyclopaedia's* research-led editorial and review processes cannot be severed from curation and preservation actions, nor can they be fully described by them.

The integration of scholarly and technical processes has implications for the assumed sequence of a digital curation workflow. One way in which the *SAET* publication model departs from the order of DCC's standard sequence is in the creation of metadata. For DCC, the “create or receive” stage includes the creation or reception of metadata.

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30. Martin Holmes and Laurent Romary, “Encoding Models for Scholarly Literature: Does the TEI Have a Word to Say?” in *E-Publishing and Digital Libraries: Legal and Organizational Issues*, ed. Ioannis Iglezakis, Tatiana-Eleni Synodinou, and Sarantos Kapidakis (Hershey, PA: Information Science Reference, 2011), 92, <https://doi.org/10.4018/978-1-60960-031-0>.



While some metadata are typically received at article submission (author name(s), article title, abstract), additional metadata such as keywords, key subjects, and key figures are generated during the copyediting and ingestion phases.

Likewise, the *SAET*'s model cannot be precisely mapped onto DCC's ingestion action, although the ingestion stage is broadly recognizable within the *SAET* production workflow. Due to the iterative nature of both the peer review and copyediting/proofreading process, multiple versions of the digital object (the article) may be produced and then stored. The final digital object of the article, then, is in fact the product of multiple preceding digital objects—previous versions of the article.

Editorial and reviewer involvement in helping authors prepare and refine their articles distinguishes the *Encyclopaedia*'s publishing model yet further. Articles are not received from an entirely external source but are conceptualized and shaped collaboratively, first by the *Encyclopaedia*'s editorial team and then in conversation with outside contributors in the form of authors, advisers, and reviewers. The article is subject to an ongoing process of development throughout the *Encyclopaedia*'s editorial and production workflow; the development of the article contributes to, and is simultaneously informed by, the development of the collection as a whole. This permits organic growth within the *Encyclopaedia*, allowing editors and authors to identify and pursue connections and juxtapositions that spur new research directions. Authors are empowered and encouraged to update their articles in response to developments in the collection as well as in the wider field.

These benefits of the *Encyclopaedia*'s model are accompanied by present and future challenges. As an open-access publication that does not generate revenue from registration or processing charges, the *Encyclopaedia* is reliant on other sources of funding. The project was established through grant funding; institutional support from the University of St Andrews will help to ensure the *Encyclopaedia*'s operations for the long term, and the editors are actively exploring sustainable models to resource the *Encyclopaedia*'s continued development and future expansion.

Another challenge for the *SAET*, especially as a new online resource, is that information can only be accessed and used if people know it is there. As outlined above, the editors and technical team have taken a number of steps to make the *Encyclopaedia* a readily available source of information. Web analytics have shown a steady increase in traffic to individual articles and to the *Encyclopaedia* as a whole since we began publishing articles. However, the distinctive format of the project as a scholarly encyclopedia means it does not fit neatly into established categories of open-access publication—a difficulty characteristic of diamond open-access publications innovating in methods of scholarly communication.<sup>31</sup> This means the

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31. Bosman et al., *OA Diamond Journals Study*, 89.

*Encyclopaedia* is not readily supported by the existing open-access digital ecosystem, which is more suited to handling journal articles and monographs. As such, certain open-access search engines and indexing systems may not recognize a web-based encyclopedic reference work as a scholarly output. The integration of *Encyclopaedia* articles into the academic information ecosystem is being smoothed by the editors' active approach in reaching out to external scholarly and library organizations— itself a potential benefit for scholarly collaboration. Nevertheless, this task demands more workload investment of editors than might be required in more conventional online publishing models.

The *Encyclopaedia* provides a worked example of a digital project in which the editing, production, and preservation of information are combined rather than undertaken through distinct roles.<sup>32</sup> *Encyclopaedia* articles develop through recognizable editorial stages of commissioning, editing, and review; they are subject to curation processes that align with research data lifecycles within repository systems and archives. To serve both as producer and preserver of scholarly knowledge, the *Encyclopaedia* combines and integrates the processes of both throughout the article workflow.

## 6) Conclusion: How commitment to open-access digital publishing has shaped the *St Andrews Encyclopaedia of Theology*

The *SAET*'s commitment to widening access to theology goes beyond making sure articles are free to read. The project is concerned with the underlying barriers to knowledge that open-access publishing seeks to address. These barriers may be financial or technical; they affect those with institutional affiliations and (even more so) those without. The *Encyclopaedia*'s digital publishing model delivers an academic theological resource that is without charge to authors or readers, requires no institutional affiliation or registration to access, and has in-built preservation and licensing measures to ensure articles are accurately attributed, properly maintained, and remain freely available for the long term.

Like several other diamond open-access projects, the *St Andrews Encyclopaedia of Theology* has innovated by building its own custom publication model suited to its content and scholarly communication goals.<sup>33</sup> The project is research based and academic led; it is independent of an external publisher's systems and infrastructure, meaning

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32. Consultative Committee for Space Data Systems, *Reference Model for an Open Archival Information System (OAIS)*, issue 2 (Washington, DC: CCSDS Secretariat, 2012), 2–1, <https://public.ccsds.org/pubs/650x0m2.pdf>.

33. Bosman et al., *OA Diamond Journals Study*, 89.

that it benefits from “technical autonomy.”<sup>34</sup> The capacity for scholarly and technical self-determination has also enabled the *Encyclopaedia*’s editors to tailor technical systems and workflows toward the *Encyclopaedia*’s mission to make theological scholarship both free to access and freely available online. Principles of *curation* and *preservation* are embedded in an article’s *creation* and *production*. As such, the *Encyclopaedia* can address barriers to knowledge at all stages of the editorial and publication workflow while still incorporating vital steps for curating and preserving the information it generates.

Online initiatives alone cannot remedy global knowledge inequity or redress systemic injustices concerning access to educational resources. Online availability is only one piece of the puzzle, albeit a significant piece. The question of how to address structural barriers to knowledge through open access is as complex as it is generative: “A central goal of open access has always been to make access to research more equitable and democratic, but from our current vantage point it’s clear that we need to expand our vision and objectives.”<sup>35</sup> This applies not only to developing strategies and publishing models that strive to address barriers to knowledge—such as the *SAET*—but also to an academic ecosystem that recognizes innovative approaches to research and scholarly communication and allows them to thrive.

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34. Bosman et al., *OA Diamond Journals Study*, 94.

35. Alison Mudditt, “In Search of Equity and Justice: Reimagining Scholarly Communication,” The Scholarly Kitchen, Society for Scholarly Publishing, October 28, 2020, <https://scholarlykitchen.sspnet.org/2020/10/28/in-search-of-equity-and-justice-reimagining-scholarly-communication/>.

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