Based on the analysis of the core idea of seven selected swarm-based optimization algorithms (SA), we propose a Unified Framework $UNIOA$ to simplify SA understandable on the primitive math level, to prevent SA from meaningless repetitions and to help building a common environment for the SA field. The detailed process of constructing the $UNIOA$ is illustrated, including the Unified terminologies, the Unified procedure and the Unified framework $UNIOA$. Meanwhile, practical experiments are performed to verify the reliability of $UNIOA$. In addition, a practical auto-designer demo for SA is developed, which introduces a future application of $UNIOA$. Subsequently, we leave an open discussion on the possibility of extending $UNIOA$ into the whole of nature-inspired optimization algorithms, including the SA and the evolutionary algorithms (EA).